

POPULAR Computing WEEKLY

40p

28 June-4 July 1984 Vol 3 No 26

BRITAIN'S BEST-SELLING MICRO WEEKLY

CLASSIFIEDS
START
HERE

VALHALLA

GLUG GLUG

TITANIC

**The No.1
Football Game
Football Manager**

Now available for BBC Model B, ZX81,
ZX Spectrum

addictive And Commodore coming soon.

**Computer Swap
01-437 4343**

Free readers entries to buy
or sell a computer.
Ring 01-437 4343 and give
us the details.

VIC-20 SOFTWARE to sell or swap.
Bongo, 4 Gates, Outback, Bewitched,
Catcha Snatcha, Race Fun, Arcadia,
Mission Mercury, Paratroopers, for your
expanded software. Sell £3-£5. Snoo-
ker wanted. Bishops Stortford (0279)
812459.

★ STAR
Ballooning
on Dragon
see page 10
GAME ★

News Desk

Tandy and GEC to carve up Dragon

DRAGON is to be split up between GEC and Tandy, following the company's decision to call in the receiver four weeks ago.

GEC will continue to market Dragon's new Professional computer and will take over its manufacture and the development of Dragon's new up-market business micro. GEC is also going ahead with plans to acquire UK licence to produce an MSX standard home micro — to be launched at this year's *Personal Computer World Show* in the autumn.

Manufacture of the three GEC machines, which keep

the Dragon name, will be moved to the South East.

Tandy then plans to take over support of the existing Dragon 36 and 64 machines. The company will also take over Dragon's range of software. Tandy will not however continue to manufacture the Dragon 32 and 64, commented Tandy's managing director, John Sayers, "We are definitely interested in the Dragon in terms of software support and service facilities to existing owners. But, although the Dragon and Tandy machines are very compatible, we are

continued on page 5



John Sayers of Tandy

Sinclair md defends the QL

SINCLAIR is planning an ambitious software publishing programme for the QL — over 50 titles before the end of the year.

Among the companies in discussions with Sinclair — as

Sinclair's
Nigel
Searle



well as Psion — are Quicksilva, Melbourne House, Ultimate and Picturesque. The company is also talking with a number of American software companies including Digital Research, Microsoft, Lotus, Software Arts and Ashton Tate.

"Obviously this software isn't going to appear overnight — indeed the really good programs won't appear until early next year," said Sinclair managing director Nigel Searle. "The first QLs went out only seven weeks ago and the machine's processor is new to many of the houses involved."

Because of Sinclair's current pricing policy on blank micro-drive cartridges (£3 each to the

continued on page 5

○○○○○○○○○○ This Week ○○○○○○○○○○

● **Street Life** David Kelly talks to Chris Greet of Toshiba on page 12 ● **BBC & Electron** Neil Barnes demonstrates a multi-purpose facility program on page 25. ● **Commodore 64** Simon Wallace with a sophisticated word processor program. See page 32. ● **New Releases** This week's selection includes Figaro 64 from Saxon Computing and Look Sharp from Mirrorsoft on page 52.

MIMI MICROCOMPUTERS

The Ultimate Choice....

for
Software
Adaptability
Flexibility
Ease of Use



BRITISH MADE
BUY
BRITISH MICRO



A HEGOTRON GROUP COMPANY

BRITISH MICRO

Penfold Works, Imperial Way, Watford, Herts WD2 4YU, England, Tel: (0923) 48222 (Market) 43956, Telex: 946024

The Team

Editor
David Kelly

News Editor
Christina Erskine

Features Editor
Graham Taylor

Production Editor
Lynne Constable

Editorial Secretary
Geraldine Smyth

Advertisement Manager
David Lake

Assistant Advertisement Manager
Alastair MacIntosh

Advertisement Executive
Tom Watson

Classified Executive
Diane Davis

Advertising Production
Lucinda Lee

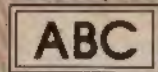
Administration
Theresa Lacy

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly,
12-13 Little Newport Street,
London WC2R 3LD
Telephone: 01-437 4343
Telex: 296275

Published by Sunshine Publications Ltd.



MEMBER OF THE AUDIT
BUREAU OF CIRCULATIONS

ISSN 0265-0509

Typeset by The Artwork Group,
55-63 Goswell Road, London EC1.
In association with Ink on Paper Ltd.
Printed by East Midland Litho Printers
Ltd, Oundle Road, Woodston,
Peterborough PE2 9QR.

Distributed by S M Distribution
London SW9. 01-274 8611. Telex: 261643
© Sunshine Publications Ltd 1984

How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

News	5
to come	
Star Game	10
Ballooning on Dragon by Nicholas Edmunds	
Street Life	12
David Kelly talks to Chris Greet	
Reviews	17
In-depth software analysis	
Dragon	21
User defined graphics by E Jackson	
Spectrum	21
Chemical elements and symbols	
BBC & Electron	25
Multi-purpose facility program by Neil Barnes	
The QL page	31
Parallel printer interface by Andy Pennell	
Commodore 64	32
Word processor by Simon Wallace	
Open Forum	35
Four pages of your programs	
Microradio	37
Ray Berry's column	
Arcade Avenue	38
Tony Kandle's arcade check	
Adventure	45
Tony Bridge's corner	
Peek & Poke	45
Your questions answered	
New Releases	52
Latest software programs	
This week	54
Top 10 plus all this week's software	
Competitions	55
Ziggurat, Puzzle, Hackers	

Editorial

Choosing the processor chip for the machine is probably the most important decision a new micro manufacturer has to make. An already established chip must be chosen in order to stand any chance of attracting software support. And nothing kills a new micro faster than a lack of good software.

So far so good. But what happens when your first product has been a great success? What next? Look at what others have done. Apple, Sinclair, Acorn and Commodore. They all launched the same computer again only in a different form. So we have the Apple II, Ite and Iic. The ZX80, ZX81 and Spectrum. The Atom, BBC and Electron. And the Pets, Vic20, C64 and now the Plus/4 and C16. Even where the machines are not directly software compatible the manufacturers have made sure they have taken their existing software providers with them by keeping the same processor.

Yet this approach only works for so long. Existing chips are eclipsed by new advances in semiconductor technology and competitors begin to catch up. Then comes the crunch. Companies have to risk throwing everything away, in the hope of producing a 'new generation' of more powerful machines.

Apple was the first to take the plunge. After the 6502 Apple II, it went out on a limb to produce the the Lisa using the more advanced 68000 chip. For two years Apple's position was in question. Now we have the Mac and everything is rosy again.

In January Sinclair jumped. It had no choice — a Spectrum remake would have let in its competitors. If the QL somehow fails to be a huge success then the QL Mark 2 will be. Sinclair has made its move.

Now look at Commodore — it is playing safe. The Plus/4 is, to all intents and purposes, a new C64. And, like its predecessor, it will be very successful. But then what? Commodore will be deciding whether or not to jump in two year's time just when Sinclair will be gaining strength.

Subscribe to Popular Computing Weekly

I would like to subscribe to *Popular Computing Weekly*.

Please start my subscription from the _____

ISSUE

UK Addresses: ☐ 26 issues at £9.98 ☐ 52 issues at £19.95

Overseas Addresses: ☐ 26 issues at £18.70 ☐ 52 issues at £37.40

Please tick relevant box

I enclose my cheque ☐ *Popular Computing Weekly* for _____

Name _____

Address _____

Please send this form, and cheque, to *Popular Computing Weekly*, Subscription Dept., 12-13 Little Newport Street, London WC2R 3LD.

QL defence

continued from page 1

software houses) initial software releases for the QL will not be cheap. "The houses we have so far signed contracts with are mostly writing packages which sell for around £40, so the price of the blank cartridge is less significant," said Searle.

"I wouldn't disagree that the current cartridge price is too high — the software houses all think so. But we have to balance supply and demand." At present Sinclair is producing over 100,000 cartridges a month but intends to increase production to over 40 million a year. Then Searle is confident the price will come down.

Also, Sinclair will soon announce the names of a number

of independent software duplication companies which will manufacture Microdrive software.

The US version of the QL will go out with Microdrives although Nigel Searle did not completely rule out the possibility of fitting a disc drive. "Obviously we are not so arrogant a company that — if the QL were to be totally unsuccessful over there — we wouldn't scratch our heads and maybe put in a disk drive."

Searle is confident that the QL's troubles are now past: "In some respects we got off to a bad start with the QL — with its 'dongle' and production problems it was sometimes a little depressing. But while the press were jumping all over us we have been putting things right."

Dragon carve-up

continued from page 1

not interested in the Dragon 32 and 64 per se."

Tandy is, however, interested in acquiring Dragon's assembly facility in Kenfig, South Wales. Advisors from Tandy UK's American parent company and its French manufacturing plant have visited the Welsh site and Tandy is believed to have made an offer for the plant to the Dragon receiver Touche Ross. Tandy would not confirm the bid though: "Our product manager in France has been to look at the assembly plant and, while it may be an attractive idea, it is only a possibility," said John Sayers.

Amstrad on time

AMSTRAD has joined Dragon in that select band of micro manufacturers who have got their machines into the shops when they originally planned.

Rumbelows on the Edgware Road in London has been the first store to take delivery of the Amstrad micro — with some 800 machines in stock.

Software is here too. Eighteen titles to kick off with from Gem, Romik, Mikrogen, Bourne, Softspot, Temptation and Britannia. All the titles are £7.99 except *Introduction to Basic* which is £19.99.

New disc drive under £100

THE sub-£100 disk drive has arrived.

Manufactured by Radofin, a new device called the Quickdisc will soon be available for the Spectrum and Aquarius machines, with a Commodore 64 version to follow.

"It has always seemed incongruous to produce expensive



sive disc drives for inexpensive machines," said Jackie Beaumont, spokeswoman for Radofin.

More US games come to UK

CHEETAHSoftware is the latest company to bring American software over to this country.

It has signed a deal with US software house Imagic to produce its games for the Spectrum.

"In terms of graphics and playability, Imagic's games are stunning," said Peter Hardingham, CheetahSoft's marketing director. "However, the games are only available on the Atari in the US

Topo slows down

ANDROBOT, the US robotics company has been forced to dramatically scale down production of its \$1,500 Topo personal robot and delay the introduction of its two other devices, *Fred* and *Bob*, because of financial difficulties.

"The company had been looking for more venture capital to finance production of the new robot, *Fred*," explained Graham Daubney, development director of Androbot's UK distributor, Prism.

"Now Sysorex International, who already had an investment in Androbot, has made a further investment of \$2m, and has taken a major shareholding in the company."

"Prior to the funding Androbot had decided to ship Topo on a much reduced scale. However, Prism still has a considerable stock of the devices, and we will certainly continue to provide Topo, on both rental and retail basis."

Fred was originally scheduled for the international market, but now Androbot is looking only to the US in January 1985, when it hopes to have produced 10,000–15,000

units. *Fred* is a \$200 table-top 'robot' with turtle-like capabilities nicknamed a 'drawdroid' by Androbot.

Prism is now looking at the possibility of manufacturing



Androbot robots in this country. "Although we are considering the idea, any decision depends on the technology first being available in the US. When *Fred* has actually been produced, we can start to look at the feasibility of manufacturing here more closely," said Graham Daubney.

Flight games?

RICHARD Branson's Virgin Atlantic budget airline which got off to a flying start last week, is looking at the possibility of providing computer games as in-flight entertainment for passengers.

"It won't actually be possible to provide a full range of games until we can fit a flat-screen tv on the back of passengers' seats," said Virgin's Nick Alexander.

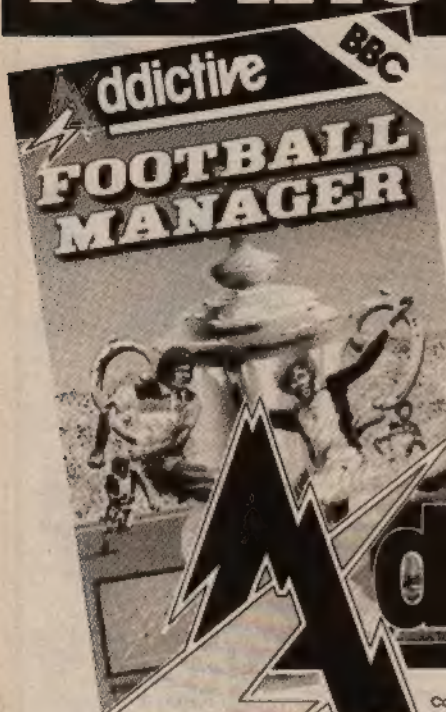
"At the moment we are negotiating with the companies which produce hand-held games to use these. Transatlantic flights can be very boring, and arcade games, or even flight simulators would certainly help to pass the time."

No more A for Acorn

ACORN has formally announced its intention to discontinue sales of the model A BBC micro from September 1, 1984.

The No.1 Football Game Now available for the BBC model 'B'

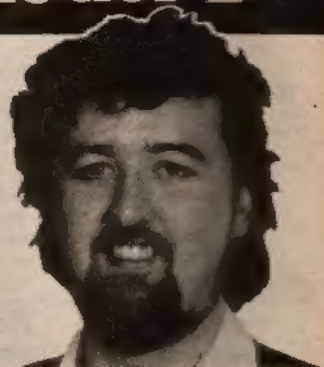
BBC Model 'B',
ZX81 16K,
ZX Spectrum 48K



Football Manager

Designed by Kevin Toms

This outstanding game of skill and strategy is now widely available and you can join the many thousands of satisfied customers who have purchased the game. This is no five minute wonder – you will be playing this game for hours over many weeks (we know – our customers tell us!).



Kevin Toms

Some of the features of the game:-

- ★ Matches in 3D graphics ★ Transfer market
- ★ Promotion and relegation ★ F.A. Cup matches
- ★ Injury problems ★ Full league tables
- ★ Four Divisions ★ Pick your own team for each match
- ★ As many seasons as you like
- ★ Managerial rating
- ★ 7 skill levels
- ★ Save game facility

Addictive

★ ZX81 Chart
Home Computing Weekly 2/2/84

Comments about the game from press and our customers

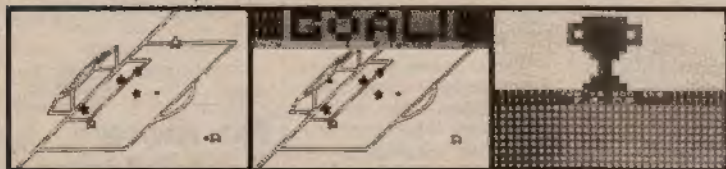
"FOOTBALL MANAGER is the best game I have yet seen on the Spectrum and my personal favourite of all the games on any micro... To the ordinary person it is an excellent view of what can be done in the field of computer games... The crowning glory of this game is the short set pieces of match highlights which show little stick men running around a pitch, shooting, defending and scoring... It is a compulsive game but people who cannot take game sessions of 9 hours or so, which happened on one happy Sunday, will be grateful to know that there is a 'save to tape' option. FOOTBALL MANAGER has everything it could... The

originator, Addictive Games, certainly deserve the name." Rating: 19/20 (Practical Computing – August 1983).

"When I first received this game I spent the best part of the weekend playing it. Since then I have returned to it more often than any other. The truly addictive quality of this game is the remarkable way it mirrors the real football manager's problems..." (Personal Computer Games – Summer 1983)

Programmers

We want your software. Send us a sample. If accepted, we will supply generous royalties plus cash advance from Kevin himself.



Action from the Spectrum version

Versions coming soon for

Commodore 64

**Dragon, Oric
and Atmos.**

"I am writing to say what a great game it is. I have spent over 45 hours on it." (Mr. D. Feam – Gloucestershire.)

Available from computer software stockists nationwide, including & John Menzies

Prices: BBC Model B £7.95
Spectrum 48K £6.95
ZX81 16K £5.95

(N.B. 3D GRAPHICS ARE NOT INCLUDED IN THE ZX81 VERSION).

Overseas orders add \$1.50

To order by mail (p&p free) send cheques or postal orders to:

Addictive Games

7A RICHMOND HILL BOURNEMOUTH BH2 6HE

Dealers! For urgent stocks send your headed notepaper direct to our address.

Another Spectrum bug

Whooooope, I've found a new bug on the ZX Spectrum.

Try this . . .
LET ANSWER=42:IF
ANSWER IS FORTY
THREE THEN PRINT
"BUUUUUUG!"

Surprised? I was. In fact, you can have any old trash after the word *Answer* as long as it starts with a space, and the computer will still think it's the same variable. Try LET ANSWER B U G = A N S W E R PLUS+12:PRINT ANSWER. I could go on and on about the rules for all this, but it's a lot more fun to discover them for yourself. Oh, and by the way, I haven't got a clue as to where or what the fault in the ROM is, so perhaps someone with Dr. Logan's ROM disassembler could find it.

PS. Do I get a medal?

Julian Skidmore
25 Crossall Road
Trowell
Nottinghamshire NG9 3PG

A distorted picture

I read your publication every week, and up to now, I assumed that the content of your magazine would be fairly accurate.

But I must admit that I now have my doubts. I have been in the Consumer Electronics business all my working life (a mere 16 years) and although not in the computer field as such (hi-fi being my particular part of the industry) I do feel that I know possibly a little more than some of your readers.

I too returned from the CES last week, and I could not believe the rubbish that your David Kelly reported as fact regarding the show. I have been at CES regularly for the last 12 years, so I think I know possibly a little about the show. This year for the first time, I was exhibiting at the show with my U.S. principals. True we exhibited at the Conrad Hilton rather than McCormick Place but your report was so full of

inaccuracies of a general nature that it must give your readers a totally distorted picture of the industry.

First, the show was not besieged with 100,000 visitors for the start on June 3rd. Total attendance at the 4 days was between 91,000 and 92,000 people. *Over 4 days, note.* All trade. Secondly, does not Radio Shack count in your carve-up of the computer market? Obviously known as Tandy in the UK, the range of Radio Shack computers is very highly respected in the USA and they do hold a large share of the market, if only by virtue of the fact that in some towns, they may be the only computer dealer around. I do not dispute your figure of 60% market penetration for Commodore, but I do think that you have ignored a large proportion of the market to arrive at a figure that suits the tone of your article.

The average wage of the Americans is \$44,000. Come on. Where did you get that figure? The average wage in America is closer to \$12,000. I can just see the lines outside the emigration department of the U.S. Embassy.

Why no mention of the fine effort made by British software houses? Good grief, I as a Britisher was complimented on the fine promotional idea of Virgin and Quicksilver in providing a double decker bus to take visitors from the hotels to the exhibits.

Finally, anti-Japanese feelings in America. You obviously do not understand the mentality of Madison Avenue. Comparative advertising in America is quite developed. For example, Pepsi-Cola compare their products with Coca-Cola. This does not mean that there is an anti-Coca-Cola feeling in America. It simply means that Pepsi are trying to draw customers away from the "market-leaders". The automobile manufacturers do the same. And as the consumer is buying Japanese compact cars, the comparison is made against Japanese imports. Hence the slogans "better than Japanese imports; fighting back against the Japanese." Oddly enough, as far as the trade is concerned in the USA (and I mean the

whole electronics trade) computers are a commodity to be sold. The country of origin does not matter. The marketing is all important. Commodore are really good at that . . .

I do have a feeling that the average age of your readers is quite young. Equally well I think that their intelligence would probably be above average. Please do not insult the intelligence of your readership. David Kelly's article could have been written without ever leaving the U.K.

B Blank
Sota (UK)
41a The Grove
London N3

The attendance at the end of the second day was 92,118. Being a trade show, by far the majority will have registered on the first day. Radio Shack's (Tandy's) share of the US market has fallen over the last year and the company did not bother to exhibit at CES. Also, no independently produced software for the Tandy machines was shown by any of the other exhibitors. A recent survey of potential home computer buyers published in *Nation's Business* showed a medium household income of \$53,007. The average US wage is much lower than this but the lower income households are not computer buyers. The UK software was covered in Part 2 of the report. The point about the Japanese MSX companies is that micros and software are fields in which the US (and the UK) has high hopes of being able to compete.



"Don't just stand there — do something"

Positively infuriating

I read your magazine regularly and find it most informative and interesting, but at the same time positively infuriating. The number of spelling mistakes is, quite frankly, appalling and this week's (Vol 3, No14) crop of 'independants' has finally driven me to write a letter.

Would you please de-bug your word processor and tell it that 'independant' is spelt independent.

H Fardesden
1 Manor Court
Breaston
Derby

Polypar Computing sets the standard the rest follow

Help and information

As it now seems improbable that Pete Woods will ever resurrect the former "Dragon Dungeon" business, I would like to ask any of your readers who may have been subscribers to the Dungeon's "Dragon's Teeth" magazine if they would be interested in an attempt to reform as a (strictly non-commercial) User Group.

I doubt that we would be able to attempt anything as comprehensive or elaborate as the original, but I think that it could serve a useful purpose, if only on a help and information exchange basis.

Even with Dragon Data's lousy marketing methods, and some of the worst software any machine was ever cursed with, the old D.32 still survives as a good general purpose machine (as anyone who ever used one rather than reviewed one can confirm!); the 64 is just as good, but no one seems to want to know, so it's up to us!

If anyone is interested in trying to get something started, I'll be pleased to hear from them. . . all ideas, help, and suggestions welcome.

Paul Grade
6 Navarino Road
Worthing
Sussex

NEW
UNEXPANDED
VIC 20

GAMES DESIGNER

MAKE GREAT GAMES....

Create your own amazing games with
Galactics unique **GAMES DESIGNER** cassette
for the unexpanded VIC 20, only £9.95
including post and packing

ONLY
£9.95

★No Programming experience Needed ★

With the **GAMES DESIGNER** you make your own machine code games.
You can design all the Graphics, Screen layouts, Theme tunes, Explosions,
Sound effects, Player speed, Alien speed, Skill level, Personalised game
credits, Scoring values, Keys used, Number of lives, Intelligence of aliens,
— whats more no programming experience needed.

Also includes 3 sample games:-
KANGA, ZYON and KRAZY MAZE.

NOW AVAILABLE FROM ALL LEADING BRANCHES OF



Galactic Software

UNIT 7, LARCHFIELD ESTATE,
DOWLISH FORD, ILMINSTER

SOMERSET TA19 0PF
TEL: (04605) 5161



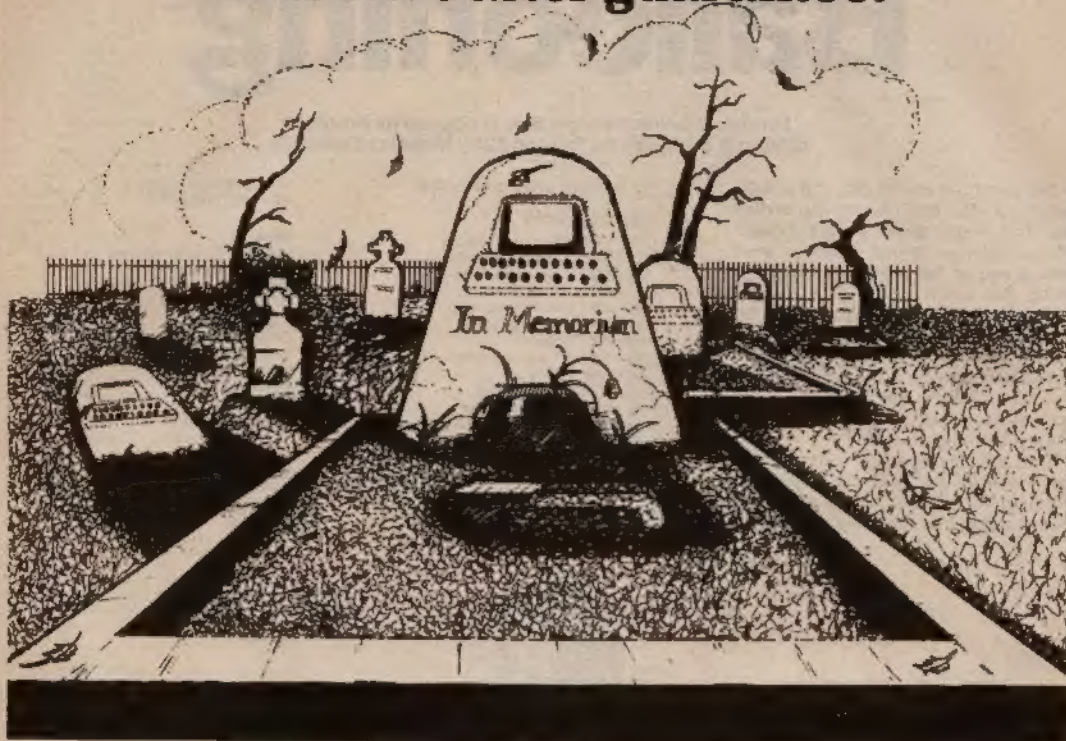
MAKE GREAT GAMES

- ★ No programming experience needed
- ★ Full colour Hi-Res Graphics
- ★ Make your own sound effects
- ★ Joystick or Keyboard control

ALL IN MACHINE CODE

- ★ Variable degree of difficulty
- ★ Make your own, Monsters, Moonscapes, Space Ships, Aliens, Kangaroos or Asteroids
- ★ Create your very own Games

This is no game This could be your reality Is there life after guarantee?



With a GLOBEL no quibble guarantee* the answer is

YES!

*Our warranty covers the holder for one year, all electronic components within their computer including all labour charges and if necessary we will replace F.O.C. the whole computer.

No other company can offer your computer Globel protection. All repairs are undertaken within our own workshop by fully qualified engineers.

Don't play games! Send today for the GLOBEL no quibble guarantee

Dare you afford not too???

For the price of a first class software game you get first class hardware protection from GLOBEL: The largest home computer maintenance company in the United Kingdom.

	Machine up to 24 months old	Over 24 months
CBM 64	16.50 per year	20.00 per year
SPECTRUM 16K	8.00 "	14.00 "
SPECTRUM 48K	10.00 "	16.00 "
BBC B	19.50 "	25.00 "
VIC 20	8.00 "	14.00 "
ORIC	8.00 "	14.00 "
DRAGON 32K	16.50 "	20.00 "
ELECTRON	16.50 "	20.00 "
MTX 500	18.50 "	24.00 "
ATARI 600XL	16.50 "	20.00 "
SINCLAIR QL	25.00 "	

If your machine is not stated
please enquire for price of
yearly contract at address
below.

Or telephone
01-571 4416

TO GLOBEL COMPUTER CONSULTANTS

NAME COMPUTER

ADDRESS DATE PURCHASED

..... SERIAL NO.

..... (ENCLOSE RECEIPT IF POSSIBLE) PCWK1

I enclose cheque/PO for £..... for a yearly
maintenance agreement or alternatively send large
S.A.E. for information and copy of our warranty.

GLOBEL COMPUTER CONSULTANTS

CHARLES HOUSE, BRIDGE ROAD, SOUTHALL, MIDDX UB2 4BD. TEL: 01-571 4416

Setting the standards

David Kelly talks to Toshiba's Chris Greet, founder of the UK MSX Working Group

When the world's largest electronics companies club together in support of a particular design standard then everyone has to sit up and take notice.

So it is with home computers and MSX. MSX is intended by its Japanese supporters to become the world's first home computer design standard, and they will be putting a considerable effort into trying to achieve their goal. There will be no shortage of funds going into the plan. Just one of the eight companies involved — Toshiba — had a turn-over last year of over £7,100m. Their combined net sales dwarf UK companies like Sinclair or Acorn. Yet the Japanese companies are not computer specialists and they have turned to the US company Microsoft for their MSX design.

Every MSX micro uses the same internal circuitry and, as a result, software and peripherals produced for one machine will run with another.

Obviously, any standard has its problems. Having to maintain software compatibility across a range of machines means there is little scope for change or future development.

But a standard does offer any computer user one fundamental advantage. There is no longer the problem of having to rely on one company to produce software and peripherals — all the MSX companies will be in competition with each other and MSX owners will be free to pick and choose their peripherals and software from any of the MSX manufacturers.

The system first went on sale in Japan in October last year. Thirteen Japanese companies now hold MSX 'licences', and MSX machines account for around 30 per cent of Japanese computer sales.

In many cases the MSX companies may sell more than one version of their machine. Toshiba, for example, sells two models — a 16K and a 64K model — both available in a choice of colours — "violet red or bearable black" according to Chris Greet. Chris Greet, Toshiba's UK product manager, is the man who set up the British MSX Working Group with the idea of bringing all the MSX manufacturers together to help co-ordinate the MSX launch in this country and encourage software development for the system.

"We want MSX to become the world standard in computers — like VHS in video," he says. Any company can manufacture an MSX machine providing it has an MSX licence. There is a licence fee and a commitment to meet the standard. There won't be an equivalent of ZX81, or for that matter Spectrum, cut-price MSX machines. There is a certain minimum speci-

cation — joystick ports, Rom slot, cassette interfaces and so on which each MSX machine must have.

"The hardware of each machine has to be basically the same — otherwise MSX would not be standard — but the idea is that companies will offer some things outside and in addition to the spec. If things go the same way as in Japan, Sanyo will offer its MSX micro with a built-in light pen. Yamaha, who joins the UK MSX group, will sell its music keyboard and synthesiser.

"One of the rules of MSX is that any peripheral which carries the MSX logo will have to be compatible with all of the MSX machines. Anyone who buys a Toshiba disc unit, for example, can use it with any MSX machine.

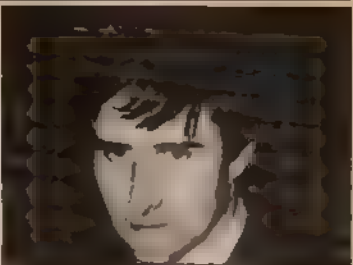
"Toshiba, like the other Japanese electronics companies has been considering entering the home computer market for a number of years. MSX has given us that opportunity," says Chris. "We started to research the British market at the end of last year after MSX had been launched in Japan and then we reassessed its potential again in January when we set up the British MSX Working Group."

Software is just as important to the success of a machine as the hardware. "Whereas we are expert at producing consumer electronics, we have no expertise of software at all. It was essential that we were able to get the established software machine working for us in the UK — that was the reason for setting up the MSX Working Group."

The main aim of the Working Group is to establish MSX as the home computer standard. The group is made up of members from all the companies who have signed an MSX licence for the UK. Currently there are eight members — including Toshiba, JVC, Sanyo, Sony, Fujitsu and Canon with a number of other companies on the point of joining some of which are UK companies. "Since our hope is to establish MSX as the home computer standard for the UK, that tends to suggest that some existing manufacturers will join our camp.

"The biggest problem with any standard is obsolescence. There are lots of upward progressions in technology which can, and will, be taken," says Chris. "And software will remain upwardly compatible. Anyone writing a big program for any manufacturer like Commodore must be wondering if it will still be possible to sell that program in two year's time. If it is written for MSX the program may not be the best thing since sliced bread in two year's time — but it will still be possible to sell that product."

Yet it is very hard to see how — with



such a rigid hardware standard as MSX — the design can be upgraded whilst maintaining compatibility. MSX's inventor Kay Nishi of Microsoft, Japan has suggested an eventual up-grade path to the 16-bit 8088/8086 family of microprocessors. In this case it is quite difficult to see how compatibility can be maintained with software written for the present Z80 MSX standard. Chris, however, remained adamant: "MSX is not a one-day or one-year wonder — there is a future.

"I can't find anyone who doesn't gain by MSX. With continuing compatibility it is obvious that software writers will concentrate more and produce more sophisticated programs, knowing that their programs will have long life. Also, the possibility of a world market must figure prominently in any author's mind." Chris is convinced that the quality of the software that is now being produced for MSX by British software houses will surprise a good many of MSX's critics.

"If you compare the specifications of MSX and the Spectrum then MSX with its TI video processor chip offering hardware sprites has the possibility of more sophisticated programming. Obviously, initially in September we will see copies of successful titles on the Spectrum and Commodore. But I would also expect to see a quickly growing number of entirely new titles which bring out the special facilities of the MSX machines.

So what is Toshiba planning for MSX? The company will launch a version of its HX-10 machine currently on sale in Japan. Only the 64K machine will come over — the 16K will be left back home. MSX will not be cheap. The 64K version will not be the most competitively priced micro on the market. Toshiba's machine will come in somewhere just under £300. A range of peripherals will be offered at launch to accompany the machine. It is in the area of peripherals that MSX will really come into its own — the music synthesisers, robots, hi-fi controllers, video recorder sub-titling machines.

Toshiba will offer an MSX disc drive, a dot-matrix printer, joysticks, and probably a printer/plotter. To follow will be a music keyboard and a robot.

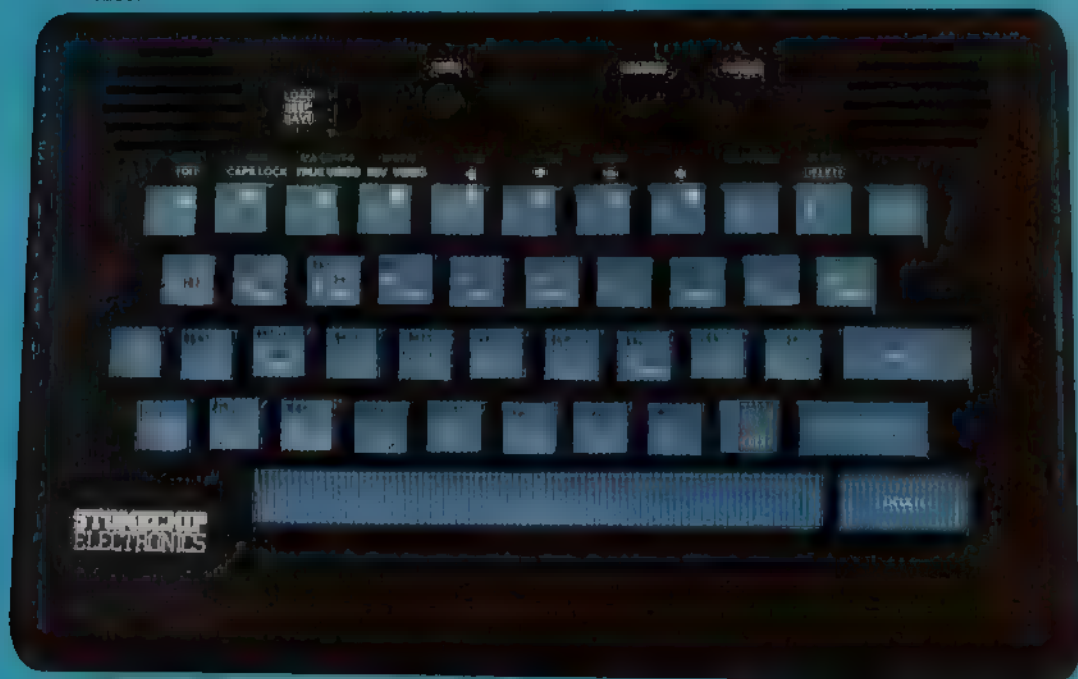
"Toshiba are currently market leaders with MSX in Japan — this is one of the reasons we are likely to be more advanced with our plans for MSX in the UK."

The Key To Success!

Now, with the new Stonechip Spectrum Keyboard, the user has no worry of damaging the Spectrum itself as improved designing enables it to fit the case perfectly.

Assembling the case is simple as it consists of two halves, the top half containing the keyboard, with a small printed circuit board, attached by ribbon cable, plugging into the rear of the Spectrum. The lower half fits precisely around the Spectrum, thus preventing any risk of damaging through movement.

Your Sinclair guarantee need not be invalidated since the Spectrum does not require removal from its case.



THE MAIN FEATURES OF THE KEYBOARD ARE:

- ☐ No modifications to Spectrum necessary as it connects via rear port.
- ☐ Full-length space bar.
- ☐ Built-in 'Echo' amplifier and tape interface.
- ☐ RESET keys remove the need to disconnect power supply lead.
- ☐ Single key 'DELETE'.
- ☐ Single key 'Extended Mode' selection (ie one key replaces the CAPS SHIFT and SYMBOL SHIFT function).
- ☐ Fully compatible with Interface 1 and most peripherals.

**STONECHIP
ELECTRONICS**

Stonechip Electronics, Unit 11 The Brook Industrial Estate,
Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 333361

Extender unit available to use with Interface
2 and Kempston Joystick Interface. £2.50.

£59.95

DEALER ENQUIRIES WELCOME
Delivery approximately 20 days

To: Stonechip Electronics, Unit 9, The Brook Industrial Estate,
Deadbrook Lane, Aldershot, Hants. Telephone: (0252) 333361

Please forward me the following products:

All prices are inclusive of VAT, Post & Packing for U.K. deliveries
(overseas add 15%)

Name

Address



Please attach my Account
Card Number



Enclose Cheque/P.O. for £



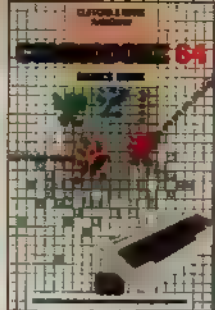
BBC BASIC For Beginners provides a comprehensive training system for this complex computer language, essential for every owner wishing to develop their own programming skills. An essential source book for both the BBC and Electron.



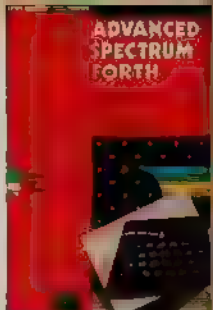
Commodore 64 Sound & Graphics — Now enables you to use all of the sophisticated sound & graphics capabilities of the Commodore 64 — by explaining the features, involving you in design and coding in a real application and by providing the necessary general purpose machine code routines.



Commodore 64 Exposed. A complete and comprehensive guide that clearly explains every function of your Commodore 64 from BASIC to Machine Language. Includes full details on advanced programming, graphics and sound.

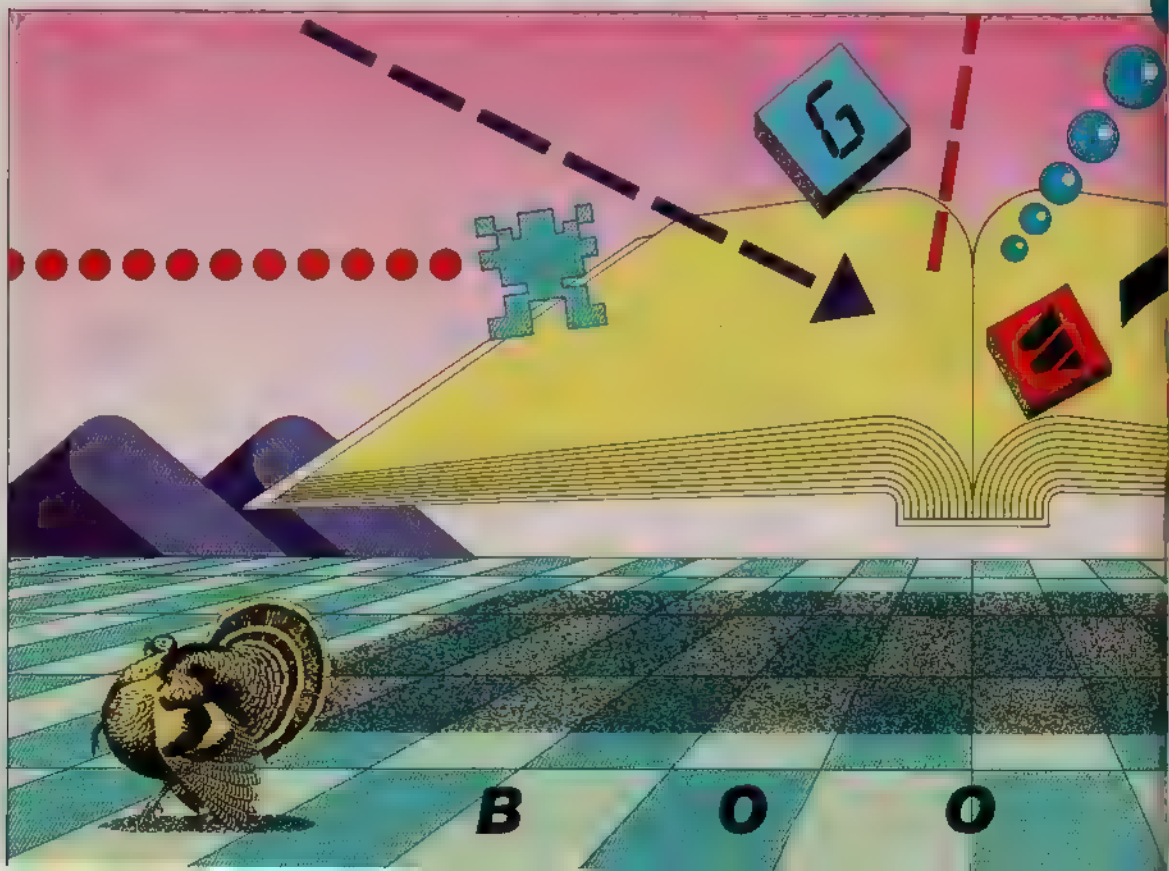


Commodore 64 Games Book. Teach your Commodore 64 every trick in the book. 30 programs ranging from nerve shattering space games to real life adventures. "For a Commodore 64 games enthusiast, this is a must." — Personal Computer News.



Advanced Spectrum FORTH With the growing popularity of language, other than BASIC AND FORTH in particular, there is real need for information on how to use these languages. This book does not attempt to teach FORTH — provides the advanced programmer with an in-depth look at this exciting language.

MELBOURN





Spectrum Microdrive. In this book Dr. Ian Logan gives a detailed explanation of the Spectrum Microdrive — how it works, ■ capabilities from BASIC and Machine Language and the networking and RS232 possibilities.



Supercharge Your Spectrum. Extend your Spectrum with ready made Machine Language routines. Now without any additional effort you can overcome the limitations ■ BASIC — faster programs, more powerful graphics commands, realistic explosions, great sound.



Spectrum Machine Language For The Absolute Beginner. A 'no jargon' introduction to Spectrum Machine Language. "One of the best I have seen." — Popular Computing Weekly. "Very readable and excellent value ■ the beginner." — Sinclair Users' Annual.

Orders to:
Melbourne House Publishers
131 Trafalgar Road
Greenwich, London SE18

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

☐ Please send me your free catalogue.
Please send me:

VIC20

- ☐ Vic Innovative Computing £5.95
☐ Vic ■ Exposed £6.95

COMMODORE 64

- ☐ Commodore 64 Games Book £5.95
☐ Commodore 64 Exposed £6.95
☐ Commodore 64 Sound & Graphics £5.95

DRAGON 32

- ☐ Dragon 32 Programmer's Reference Guide £5.95
☐ Dragon Machine Language for the Absolute Beginner £6.95
☐ Enter The Dragon £4.95

ORIC-1

- ☐ Meteoric Programming £5.95

BBC/ELECTRON

- ☐ BBC BASIC for Beginners £7.95
☐ BBC Hardware Projects £8.95

SPECTRUM

- ☐ Over The Spectrum £4.95
☐ Spectrum Machine Language ■ the Absolute Beginner £1.95
☐ Understanding Your Spectrum £6.95
☐ The Complete Spectrum ROM Disassembly £9.95
☐ Spectrum Hardware Manual £5.95
☐ Supercharge Your Spectrum £5.95
☐ Spectrum Microdrive Book £5.95
☐ Advanced Spectrum FORTH £8.95
☐ Advanced Spectrum Machine Language £6.95

GENERAL

- ☐ C&VG Book of Adventure £5.95
☐ A Guide To Playing The Hobbit £5.95

Please add 80p ■ post & pack

TOTAL

I enclose my ☐ cheque

☐ money order for

Please debit my Access card No

Expiry Date

Signature

Name

Address

Postcode

Access orders can be telephoned through on our 24-hour ansafone (01) 856 7387.



POP/5



K S

At £6.99 they're a STEAL!!

ME FLIP THE CASSETTE

SOLVE THE ADVENTURE



All at £6.99



Please supply:

Quest For the Garden of
Eden ☐ Jokers Wild ☐
The Emperor Must Die ☐ The
Sorcerer's Apprentice ☐ Four Gates ☐
I enclose a cheque/P.O. for:
Name
Address

**Trade Enquires
Welcome**

The wobble factor

Despite its recent success as a televised sport the essence of darts is to feel the weight of each dart, to enjoy its glorious trajectory — and maybe to down the odd pint between rounds.

So why bother to make a micro version of the game?



One immediate answer is to make it available to the handicapped. The darts can be controlled by five keys or by joysticks and it's one of the few programs around to offer the

option of using one or two joysticks. That arrangement should allow quite easily for adapted controls.

It is a two-player game. You are offered three variations: 501, Round the Board and Cricket. Brief instructions explain the intricacies of each. A good representation of a board is drawn. You manoeuvre the dart to the right spot and fire, but it isn't that simple: each dart has a wobble factor that makes it very tricky to control. This "three pints down" effect may add realism for some and it is the making of the game.

Scoring is accurate and there is a rather nice burp noise when you hit metal or miss and a fanfare when you win. It gives you much of the game's fun, but none of the friendly atmosphere of your local.

Dave and Jan Watterson
Program Darts Price £5.70 Micro BBC 32K (OS 1.2) Supplier MRM Software, 17 Cross Coates Road, Grimsby, S. Humberside DN34 4QH.

Aggressive dinosaurs

Any attempt to classify *The Beginning* under one of the standard computer games headings is doomed to failure — it contains elements of arcade action, puzzles, computerised board games and educational software, all within the same program.

The game consists of ten levels depicting stages of the evolution of life on Earth. Starting from a single molecule you develop through various aquatic forms of life, through fish and reptiles, eventually to a primitive mammal. To progress through the game you have to collect survival points by achieving various goals which you are set, for example designing a good fish! At each stage of the game you must avoid assorted perils like predatory trilobites, hostile climates or aggressive dinosaurs. Falling prey to any of these will lose you points. If your points total falls to zero you join the dodo and become extinct.

The game is certainly original with plenty of explanatory

text and reasonable graphics. However, it is difficult to be enthusiastic about it. The action is rather slow (it is all in Basic) and not all that challenging, so that once you have completed all ten stages there is not much incentive to have another go.

Faster and more lively graphics would have improved it a lot.

Richard Corfield
Program In the Beginning Price £6.90 Micro Commodore 64 Supplier Mosaic, John Wiley and Sons, Baffins Lane, Chichester, Sussex.



Daffy ducks

A couple of years ago, I spent much time, and money, playing an arcade game called *Carnival*. It was a fairly simple game, consisting of not much more than a fairground shooting gallery. But, for all its simplicity, it was extraordinarily addictive. There have been many attempts to emulate this arcade original, but even that great games machine, the Atari, has not been able to come up with a worthy likeness.

Finally Eclipse, writing for the Spectrum, have finally managed to translate the game to the home micro. The format is very easy to grasp: your little pistol is at screen bottom, and moves from left to right, firing at the various objects that move to and fro above. Each time one of these objects is hit, it disappears to the sound of a

metallic clang. After clearing the screen of the ducks, rabbits and so on, a dancing Bear makes a foray across the screen, and you can shoot him for extra points — he won't disappear, but instead turn right around and give you another chance to zap him.

Here you will find all the same features as in the arcade version — the daffy ducks that, if you ignore them for too long, will eventually swoop down and gobble up your precious bullets, and the revolving clay pipes. Also present is the bonus box, and the extra bullets, assured as extra points for knocking out the word B-O-N-U-S.

And, amazingly for the Spectrum, there is even the same awful music which twiddles away while you play — absolutely essential to the full enjoyment of this program. Just try and tear yourself away from *Carnival*!

Tony Bridge
Program Carnival Price £5.95 Micro Spectrum Supplier Eclipse Software, EMS (Holdings) 10 Marshalsea Road, London SE1 1HL.

Magic mushroom

Kermits of the world unite! The intrepid survivors of *Frogger* are subjected to even more lethal attention in *Mad Monty* from Screenplay, a variation on the "caterpillar" arcade games.

The object is to steer a snake within a walled garden to gobble up frogs. The snake grows longer with each successful conquest but is fatally wounded either by hitting a garden wall or by crossing its own tail. To make things worse, each digested frog spawns a poisonous toadstool. A succulent mouse appears from time to time, as does the odd magic mushroom which counteracts toadstool poison.

The game has five speeds and is controlled by the use of the four arrow keys. In action, I found Level 2 to be easier to start on than Level 1 and that Level 5 really requires a joystick. All the frogs have to be eaten from the garden before progressing to another screen and this is exceedingly difficult.

The graphics and sound are crisp and the score panel is clearly displayed above the field of play. Unfortunately, the

game is let down by minor irritations. The original program has apparently been "topped and tailed" using some extremely crude Basic. A "hall of fame" facility has been added which is displayed after each 3-try set for a tedious ten



seconds or so and then two blocks of colour are laboriously built up in which to display the "continue" option. It doesn't affect the game itself, but I found that it spoils the feel of pace and speed that an arcade game needs.

D Trueman
Program Mad Monty Price £5.95 Micro Dragon 32 Supplier Screenplay, 134 St Vincent Street, Glasgow G2 5JU.

Blue loonies

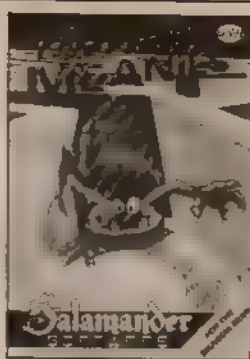
In Salamander's *Red Meanie* game the player is an "intergalactic Cheese-snuffer" trapped in a maze of corridors. The object is to eat up as many cheeses as possible, which are found in the corridors, and avoid being eaten by Red Meanies who are also in the maze.

Some of the cheeses when eaten turn Red Meanies into harmless Blue Loonies which are edible, but each of these, when eaten, is replaced in the

maze by a Red Meanie. The Blue Loonies are suicidal, and seek to jump down the player's throat if not avoided in time.

The display is of a corridor maze and the forward movement can be made continuous by keeping the 'F' key depressed. This looks very effective, particularly with the perspective along a main corridor.

The Meanies are large and loom in a suitably menacing way particularly as they trundle towards you down the corridor. There is a warning sound when creatures are near and the maze retains its logical



content (four right turns brings you back to where you started). Occasionally, a creature will slit across the corridor apparently oblivious of the Cheese-snuffers which adds to the fun.

The instruction leaflet is witty and the whole game is great fun — for a while.

D Trueman
Program *Red Meanie* Price £7.95 Micro Dragon 32 Supplier Salamander, 17 Norfolk Road, Brighton, Sussex.

Budding astronomers

The solar system presents you with a wide-ranging menu offering the opportunity to learn about the sun, planets and the other assorted objects that make up and surround our Solar System.

Written with the novice astronomer in mind the program seems fairly comprehensive at a beginner's level, although I would have liked more than a passing reference to Halley's Comet, and some guidance about where to find it! After seeing the relative sizes of the planets, a very passable demonstration of a meteorite flashing across the sky and maps of the more important constellations, you can try some tests which enable you to find out how much you have learned.

The author is by no means an advanced programmer, but he gets the Spectrum to do all that is required using Sinclair Basic. The original cassette of the program was a little hard to load, but there is a Save to Microdrive option which al-

lows the recording of a working copy for day to day use.

I'd definitely recommend this program as a useful present to help get a budding astronomer off the ground (if you see what I mean).

Simon Springett
Program *The Solar System* Price £3.50 Micro 48k Spectrum Supplier Eaglesoft, 66 James Street, Scarborough, North Yorks.

Serious utility

Here is a serious utility program that is a joy to use and represents one of the (regrettably) all too few jewels of Spectrum programming.

An assembler is a program that will allow you to enter machine code mnemonics (the abbreviated instructions to the processor at the heart of the computer), and will then automatically convert them into the correct numerical form. If, like me, you entered the world of machine code computing by hand assembling your programs you will find the *Editor Assembler* takes a lot of the

sweat out of machine code.

Version 2.1 of this program has been made possible and necessary by the availability of interface 1, the Microdrive and an increasing number of parallel interfaces for the Spectrum. One especially useful feature is that you can now save up to 95K of assembly language onto tape or Microdrive (saved in up to 10 sections), and then assemble these sections together at one time. This enables you to create long machine code programs (at least 15K), despite



User unfriendly

It sounds harsh to say that these two cassettes represent a wasted effort on behalf of their author, but after struggling to find some good points to them that's the inevitable conclusion to which I've been forced.

The programs are designed to help you create database programs of your own in Basic. This they indeed do — the problem is that the "creation" programs are very user unfriendly, even at the point of putting the first program you need on cassette 2 and not telling you! The 20 page manual is not helpful, and the final product, ie. your customised database program, is not very flexible or useful.

Specific grouses include the lack of a *Verify* facility, essential to any serious use of a database, the slow response to key presses after some prompts leaving you stabbing at the keys and likely to miss the next prompt altogether, and the primitive *Break* protection: press *Break* and the program hangs up.

Program generator 1 and *Report Program Generator* do work, but are outclassed by the established database programs already available.

Simon Springett
Program *Program Generator* and *Report Program Generator* Price £9.95 Supplier Spectrum Visions, 1 Felgate Mews, Studland Street, London W6.

the limited free memory in the Spectrum when the Assembler (and if you have it) the companion Monitor are loaded.

This program loaded easily, seems bug free and did all it claimed. What's more, purchasers of the earlier version can upgrade simply by sending a mere £1.50 to Picturesque.

I don't have room to extol all its virtues — I suggest you buy it and find out for yourself. This is a good program, and deserves a place in every serious programmer's library.

Simon Springett
Program *Editor/Assembler - Version 2.1* Price £7.50 Micro Spectrum 48k Supplier Picturesque, 6 Corkscrew Hill, West Wickham, Kent.

Bone search

Computer games generally call on the player to take the part of the central character in the game, and these make up a pretty varied assortment. However, *Where's My Bones* from Interceptor Micros is certainly the first I have seen where you have to play the role of the ghost of a monk.

The monk, called Brother Jeffrey (or BJ for short), has been murdered by a Green Demon, who has scattered BJ's bones around in the Underworld. You have to guide BJ through an underground maze in search of his bones. Not surprisingly, the subterranean caverns are full of hazards like giant spiders, serpents, moving blocks and electrical

discharges. On reaching each set of bones, you gain points and also you replenish your shields, which are depleted each time you hit one of the underground creatures.

Although maze games are quite common, this one is challenging enough and different enough to make it interesting. The maze is not complicated, but it does require fine judgement and good timing to navigate through it successfully. Technically, the program is well up to the high standard now expected of games for the 64 with good, smooth graphics, and effective, if undramatic use of sound.

Richard Corfield
Program *Where's my Bones*
Price £7 **Micro** Commodore 64
Supplier Interceptor Micros,
Lindon House, The Green,
Tadley, Hants.

Work out the rules

Most games tell you the rules and then you play. In *Enigma* from Brainbox you play in order to work out the rules! It's a bit like playing *Mastermind* against a micro.

The game's name isn't a tribute to Elgar but to the war-time machine which produced almost unbreakable codes.

The idea is to choose cards displayed on the screen using (fair graphics) either a standard pack or an 'infinite pack'.

rule being applied. The test is to see if you can predict the result every time. If you can, then try the next rule. There are five different rules to solve and once you've worked them all out return your cassette with £4 and Brainbox will send you a cassette with five more.

The snag is that you have to keep a tally of cards accepted and rejected on paper — an anathema to dedicated hackers. It ought to be possible for a running list of moves to be displayed — some chess programs manage it.

Enigma is different enough to intrigue. The first rule was easy, the second harder and...well I haven't twigged



There are various options where either you or the computer choose cards and each time the micro tells you whether the choice is accepted or rejected. As the decisions mount up you have to try to guess the possible

the third one yet, but I will in a moment...

Dave and Jan Watterson
Program *Enigma* **Price** £5.95
Micro BBC B **Supplier** Brainbox Software Ltd., 20 Orange Street, London WC2H 7ED.

Spritley characters

This program offers the chance to fill a gap in the Spectrum's screen display facilities lamented especially by games writers, namely the absence of Sprites. Sprites are characters that can be easily moved around the screen, passing through other objects — and indeed one another.

Spectrum Sprites gives you the opportunity to set up eight sprites, each of which is contained in a 16*16 pixel square, ie four times the area of a standard character. With the program cassette you get a tiny booklet with simple instructions for setting up and using the sprites. These are straightforward, and it proved easy to design a few shapes to use — a simple test routine.

Actually using the sprites is not so easy: to display or erase each sprite requires four pokes, together with a call to a short machine code routine (saved automatically from the program tape when you save your shapes).

Dedicated games writers will find this program a useful help

to have around, but I felt the program could have given much more very easily. More than eight characters, for example, or a collision detection system that would indicate which two sprites had collided



rather than just that a collision had occurred. Perhaps a little overpriced at £7.95, but worth having nevertheless if you are writing your own arcade type games and finding the going difficult.

Simon Springett
Program *Spectrum Sprites*
Price £7.95 **Micro** Spectrum
Supplier ISP Marketing,
Crown House, 386 High Street,
Godalming, Surrey.

Mission impossible

The impression I have always had of Interceptor is one of a company which sells copies of best-selling games, notably *Manic Miner* (with their *China Miner*). This game for the Spectrum from them has yet to convince me of their originality. That said, though, this adventure looks set to take me some time to solve — and I think I'll be kept fairly busy, and happy, most of the way.

You start off by being in a spaceship when you hear a distress call — your mission being to investigate, you head for the planet. Descriptions are short, almost to the point of being boring (the yellow room is just one example). But there are a few graphic locations to brighten things up a bit. This brings out one good feature — after you have seen a graphic

once, you are not shown it again when you return to the same place unless you ask for it: this saves a lot of time and frustration.

As in the best adventures, what you are supposed to do is very unclear, so I just wander around trying to work out some sort of map, and collecting objects. Apart from the prose, or lack thereof, the game reminds me somewhat of the universally acclaimed adventures from Level 9.

Like many adventures there are some irritating anomalies. For example, on entering the Armoury, you cannot then *Examine* the armoury — the computer tells you it does not understand *Armoury*, this obvious nonsense should be tweaked out of adventures by now.

David Lester

Program *Message from Andromeda* **Price** £5.50 **Micro** Spectrum
Suppliers Interceptor Micros,
Lindon House, The Green, Tadley, Hants.

No.1

QUICKSILVA

Computing

SECTION

LATEST NEWS

QUICKSILVA

All titles available from Quicksilva Mail Order, P.O. Box 6, Wimborne Dorset BA21 7PY.

Home of The
Game Lords

EXCLUSIVE • NEW PROGRAM PROBE EXCLUSIVE • NEW PROGRAM

Meet the perils of refuse in TRASHMAN – Commodore 64 £7.95

The job may look easy but only you know the hazards. Speeding cars, cyclists, vicious dogs, over-reacting in the transport cafe or one too many in the pub! A Trashman's lot is not an easy one. Discover just how difficult for yourself in TRASHMAN on the Commodore 64.

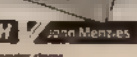
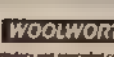
ESCAPE & 3D TUNNEL – Commodore 64 £7.95 each.

Follow the thrills!
What lies in the tunnel's depths? Flying bats, leaping toads, scurrying rats, crawling spiders and there may be more... All appearing live in the dreaded 3D TUNNEL.
Meanwhile, in the maze on the estates, what horrors lurk in the hedges? Where is the axe hidden? What prehistoric terrors will trap you? Can you survive the dinosaurs and the pterodactyls? Find out in ESCAPE if you dare! Available on the Commodore 64.

GATE CRASHER – BBC/ ELECTRON £6.95

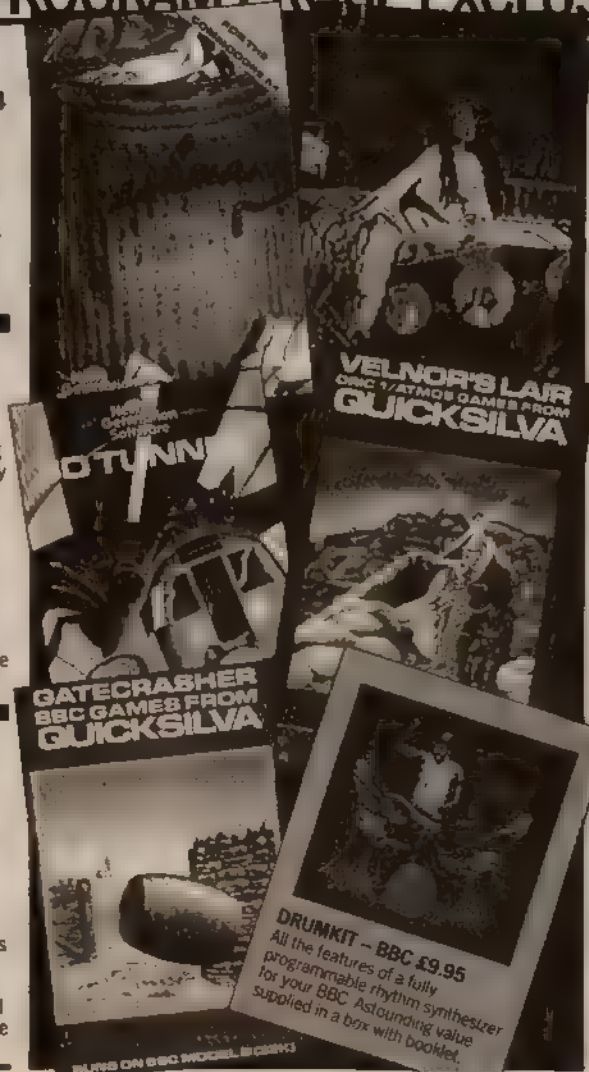
An intoxicating game for the BBC and ELECTRON.
Do you enjoy being killed by aliens? Has your keyboard melted away under the heavy artillery? Do you have nightmares of swooping birdmen? If so this is the game for you... It has none of these!
GATE CRASHER is a game of skill and strategy that will test your mind to the limits, PLUS you will also have the opportunity to WIN £200!

QED??



and leading multiple retailers and specialist computer stores.

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale, copies of which are available on request.



ELECTRO-ART – Electron £14.95

Son of BEEB-ART!
Create your own works of art with this simple to use, yet sophisticated feature-rich art tool which includes a full machine code 'Paint' routine allowing you to colour fill any shape. ELECTRO-ART is supplied in a box with a full instruction manual.

VELNOR'S LAIR – Oric 1/Atmos £6.95

Battle the evil Wizard Velnor in the caves of Mount Elic. VELNOR'S LAIR is simply the most enjoyable adventure you will play on your computer!

MINED OUT For Bill the worm. Oric 1/Atmos £6.95

Following his success on the SPECTRUM, ELECTRON, BBC, LYNX and DRAGON, Bill the worm is now appearing in MINED OUT on the ORIC 1/ATMOS computers.

COMING SOON

ANT ATTACK – Commodore 64 £8.95

The outstanding Soft-Solid 3D graphics in the breathtaking city of Anteschier are now available on the Commodore 64. Battle the giant ants to save your hero!

COMING SOON

FRED – Commodore 64 £7.95

Action beneath the pyramids! Fearless Fred, the Intrepid Archaeologist, searches the creepy catacombs below the torrid tomb of Tootiecaroon!

COMING SOON

GAMES 84 – Spectrum 48K

From the advanced programming project division of the SOFTWARE STUDIOS – GAMES 84, an Olympiad spectacular!

Art for art's sake

E A Jackson, produces graphics using P mode 3 on the Dragon 32

When using Pmode 3, the Dragon 32 has a 4-colour graphic capability which is probably superior to most of the current range of 8-bit micros. Yet, we seldom see programs which exploit this capability. Draw and Paint are powerful commands, but the effect is rather like painting with a broad brush. Often, what we require is a way of bringing out the fine detail.

Fortunately, the graphic pages are memory mapped and to obtain fine detail we can Poke graphic characters, direct to the appropriate area of screen Ram. We know that in the low resolution mode, each character produces a shape 8 pixels wide and 12 pixels deep and that 512 characters would fill the screen. In Pmode 3, resolution is 12 times greater and to fill the screen we would need to poke a massive 6144 separate characters. However, we are not looking to fill the whole screen. For our purpose it is sufficient to create small areas of fine detail.

In the high resolution mode, the first page of screen Ram normally starts at memory location 1536. However, if you have Disk Drives fitted, you will find that this location has been moved to accommodate the Disk Operating System and the beginning of screen Ram is now location 3072.

It takes 32 bytes of memory to store the information necessary to control one line of the screen display. In Pmode 3, each byte controls an area 8 pixels wide and 1 pixel deep ($8 \times 32 = 256$). The single byte at location 1536, therefore, controls the screen display at positions (0,0) — (7,0). If we consider this to be four separate areas, each 2 pixels wide and 1 pixel deep, we can build up a character shape, using any four colours in each position.

Each memory location holds a value between 0 and 255 and this value determines which colour appears in each position. Values between 0 and 255 are expressed in binary as a combination of eight zeros or ones and if again, we consider this combination of digits to represent 4 separate groups of two, we can see how the colours are controlled. For each group of two binary digits, there are four possible combinations to match the four possible screen colours.

In Pmode 3, the most useful colour combinations are green, yellow, blue and red and for our purposes, we can translate the colours to the following binary equivalents:-

Green = 00, yellow = 01, blue = 10, red = 11

If you are alarmed at the thought of having to handle a multitude of binary conversions, the following table will reduce the task to the simple addition of four figures.

If we Poke location 1536 with 255, (equivalent to $192 + 48 + 12 + 3$), the high resolution screen will display a red line, 11 pixels long

Position 1	Position 2	Position 3	Position 4
Green 0	Green 0	Green 0	Green 0
Yellow 64	Yellow 16	Yellow 4	Yellow 1
Blue 128	Blue 32	Blue 8	Blue 2
Red 192	Red 48	Red 12	Red 3

and 1 pixel deep, at position (0,0) — (7,0). If we were to Poke location 1537, with the same value, the line would be displayed at position (8,0) — (15,0). To produce a line immediately below the first position, we would need to Poke a character to location 1568 ($1536 + 32$).

Working with a piece of squared paper and a set of four coloured pencils, we can create very detailed graphic characters and if required, use Get and Put to move them around the screen. The point to bear in mind is that each block of colour must be 2 pixels wide and 1 pixel deep.

Before you start to design your graphic character, you have first to decide on the background colour. Normally, green provides the best contrast for the remaining

colours. If you change your mind later, you will have to re-calculate the values to be Poked.

Once the values have been calculated, it is a simple matter to set up a series of Data statements to Poke the values direct to the appropriate area of screen Ram. If you are not convinced of the value of this method of

creating User-Defined Graphics, enter the example program to see what can be achieved with just a little planning.

Program notes

To increase the word list change variable J2 in line 110 and add extra words in Data statements from line 1090.

- 80-180 Initialisation sequence
- 170-390 Main loop.
- 400-420 Display wrong guesses.
- 430-440 Display correct answer.
- 450-470 Display CORRECT message.
- 480-510 Update scoreboard.
- 520-540 Display fresh screen.
- 550-650 Set-up initial display.
- 660-680 Routine to draw text.
- 700-780 Data for text.
- 790-840 Set-up screen graphics.
- 850-980 Routine to control hanging.
- 990-1080 Display hanging sequence.
- 1070-1100 Data for User-defined graphics.
- 1120-1130 Data for word list

```

10 REM *****
20 REM HIGH RESOLUTION GRAPHICS
30 REM FOR THE DRAGON 32
40 REM
50 REM BY E.A. JACKSON
60 REM *****
70 DIM A(153),Z(32)
80 FOR B=1 TO 153:READ A(B):NEXT B
90 PMODE 3,1:PCLS1:SCREEN1,0
95 READ A
100 FOR B=1 TO 51:C=1536+(B*32):POKE C,A(B):POKEC+
1,A(B*51):POKE C+2,A(B*102):NEXT B
110 GET(0,0)-(23,51),Z,6
120 PCLS1:PUT (110,70)-(133,121),Z,PSET
130 GOTO 130
140 DATA 0,0,3,15,13,13,13,5,5,1,0,0,2,10,41,170
169,170,165,170,165,170,165,170,165,170,165,170
90,95,31,15,15,15,15,15,15,15,15,15,15,15,15
15,15,15,1,15,63,60
150 DATA 48,252,255,255,221,85,17,85,85,85,116,8
4,154,170,85,170,85,170,85,170,85,170,85,170,85
170,85,170,170,255,255,255,255,255,255,207,207,2
07,207,207,207,207,207,207,207,207,207,69,207,20
7,204
160 DATA 0,0,0,192,192,192,192,64,64,0,0,0,0,128
160,168,168,168,104,168,104,168,104,168,104,168
104,168,148,212,208,192,192,192,192,192,192,192
192,192,192,192,192,192,192,192,0,192,240,2
40
CHECKSUM=18828

```

An element of truth

Guy Fullalove presents a chemistry program to identify elements and their symbols

This program has been written for a 16K or 48K ZX Spectrum with a microdrive. It can be used either as a database for reference or as a test for revision purposes.

To enter the program first enter listing one, which is the source file. This will create a file on microdrive one called "data". As it starts with a *CHRS O*, it will be invisible to a *Cat* command (chapter 6, page 27).

Now type *New* and enter listing two; this is the main program. When you have entered it type *Run 9000*. This will *Save* and *Verify* the program.

Finally, type *New* followed by *LOAD "m";1;"Elements"* and the program will *Load* and *Run*.

Program Notes
Line 5 - 120 Print up the menu and take your choice

1000 - 1090 Work out the name of the element from the symbol
1100 - 1180 Print up the information from the cartridge
2000 - 2080 Work out the symbol of the element from the name
3000 - 3130 Create the test
3135 - 3210 Asks questions on symbols
4040 - 4120 Asks questions on names
9000 - 9020 *Saves* and *Verifies* the program on microdrive one

Variables

as	General response variable
ns	Element name
es	Element symbol
ram	Relative Atomic Mass
i	Level of difficulty
n	FOR - NEXT variable

```

5:REM Elements
10:REM © 1984 Guy Fullalove
20:CLS:PRINT TAB 7;"The Peri
30:PRINT TAB 5;"=====
40:PRINT TAB 5;"Options";TAB
50:PRINT TAB 7;"1) Symbols"
60:PRINT TAB 7;"2) Names"
70:PRINT TAB 7;"3) Test"
80:PRINT TAB 9;"Choose optio
n"
90:LET as=INKEY$
100:IF as<"1" OR as>"3" THEN GO
TO 90
110:GO SUB VAL as+1000
120:RUN 20
1000:CLS:PRINT TAB 9;"Symbols"
1010:INPUT "Input the symbol ";
LINE as
1015:PRINT AT 10,1;"Loading in d
ata - Please wait"
1020:OPEN #4;"":1;CHRS 0+"data"
1030:FOR n=1 TO 104
1040:INPUT #4;ns;es;ram
1050:IF as=es THEN CLOSE #4: GO
TO 1100
1060:NEXT n: CLOSE #4
1070:PRINT "There is no such s
ymbol as ";as
1080:GO TO 1140
1090:RETURN
1100:CLS:PRINT "Atomic Numbe
r ";n
1110:PRINT "Name of element:";n
1120:PRINT "Symbol ";es
1130:PRINT "R.A.M. ";ram
1140:PRINT TAB 5;"Press any k
ey to continue"
1150:IF INKEY$="" THEN RETURN
1160:GO TO 1150
2000:CLS:PRINT TAB 9;"Elements"
2010:INPUT "Input the name "; LI
NE as
2015:PRINT AT 10,1;"Loading in d
ata - Please wait"
2020:OPEN #4;"":1;CHRS 0+"data"
2030:FOR n=1 TO 104
2040:INPUT #4;ns;es;ram
2050:IF as=ns THEN CLOSE #4: GO
TO 1100
2060:NEXT n: CLOSE #4
2070:PRINT "There is no such e
lement as ";as
2080:GO TO 1140
3000:CLS:PRINT TAB 14;"TEST";T
AB 13;"=====
3010:DIM b$(1)
3020:INPUT "A test on elements o
n symbols? ";LINE as
3030:IF as<"E" AND as>"e" AND
as<"S" AND as>"s" THEN GO TO 3
020
3040:INPUT "Level of difficulty
(1 to 8) ";i
3050:IF i<1 OR i>8 THEN GO TO
3040
3060:LET z=i+13
3070:LET score=0
3075:DIM s$(10,15): DIM s$(10,2)
3077:PRINT AT 10,1;"Loading in d

```

```

ata - Please wait"
3090:FOR n=1 TO 10
3095:OPEN #4;"":1;CHRS 0+"data"
3100:LET s=INT (RAND*2)+1
3110:FOR m=1 TO 5
3120:INPUT #4;ns(n);s$(n);ram
3130:NEXT m: CLOSE #4: NEXT n: C
LOSE #4
3135:IF b$="E" OR b$="e" THEN GO
TO 4020
3136:FOR n=1 TO 10
3140:INPUT "Which element has th
e symbol ";(s$(n));"?":LINE es
3150:IF (es="") (1 TO 15)
ns(n) THEN LET score=score+10:
PRINT AT 10,5;"That was correct"
;AT 11,3;s$(n);": ";ns(n);AT 14
,5;"Press any key to continue":
PAUSE 0: GO TO 3170
3160:PRINT AT 10,5;"That was wro
ng";AT 11,3;s$(n);": ";ns(n);AT
14,5;"Press any key to continue"
: PAUSE 0
3170:CLS: NEXT n
3180:PRINT "You got ";score;"%"
3200:PRINT "Well done" AND sco
re>80
3210:PRINT TAB 5;"Press any ke
y to continue": PAUSE 0: RETURN
4040:FOR n=1 TO 10
4050:INPUT "What is the symbol f
or ";(ns(n));"?":LINE as
4060:IF (as="") (1 TO 2)=s$(n) T
HEN LET score=score+10: PRINT AT
10,5;"That was correct";AT 11,3
;s$(n);": ";ns(n);AT 14,5;"Pres
s any key to continue": PAUSE 0:
GO TO 4080
4070:PRINT AT 10,5;"That was wro
ng";AT 11,3;s$(n);": ";ns(n);AT
14,5;"Press any key to continue"
: PAUSE 0
4080:CLS: NEXT n
4090:PRINT "You got ";score;"%"
4100:PRINT "Well done" AND sco
re>80
4110:PRINT TAB 5;"Press any ke
y to continue": PAUSE 0
4120:RETURN
9000:CLEAR
9010:SAVE "e";1;"Elements" LINE
10
9020:VERIFY "e";1;"Elements"
10:REM Elements data
20:OPEN #4;"":1;CHRS 0+"data"
30:FOR n=1 TO 104
40:READ as,bs,ram
50:PRINT #4;as;bs;ram
60:NEXT n
70:CLOSE #4
80:STOP
90:DATA "Hydrogen","H",1
100:DATA "Helium","He",2
110:DATA "Lithium","Li",3,6.9
120:DATA "Beryllium","Be",4,9
130:DATA "Boron","B",5,10.8
140:DATA "Carbon","C",6,12
150:DATA "Nitrogen","N",7,14
160:DATA "Oxygen","O",8,16
170:DATA "Fluorine","F",9,19
180:DATA "Neon","Ne",10,20.2
190:DATA "Sodium","Na",11,23
200:DATA "Magnesium","Mg",12,24.3
210:DATA "Aluminium","Al",13,27
220:DATA "Silicon","Si",14,28.1

```


330	DATA	"Phosphorus"	"P"	31
400	DATA	"Sulphur"	"S"	32.1
450	DATA	"Chlorine"	"Cl"	35.5
500	DATA	"Argon"	"Ar"	39.9
550	DATA	"Potassium"	"K"	39.1
600	DATA	"Calcium"	"Ca"	40.1
650	DATA	"Scandium"	"Sc"	45
700	DATA	"Titanium"	"Ti"	47.9
750	DATA	"Vanadium"	"V"	50.9
800	DATA	"Chromium"	"Cr"	52
850	DATA	"Manganese"	"Mn"	54.9
900	DATA	"Iron"	"Fe"	55.9
950	DATA	"Cobalt"	"Co"	58.9
1000	DATA	"Nickel"	"Ni"	58.7
1050	DATA	"Copper"	"Cu"	63.5
1100	DATA	"Zinc"	"Zn"	65.4
1150	DATA	"Gallium"	"Ga"	69.7
1200	DATA	"Germanium"	"Ge"	72.6
1250	DATA	"Arsenic"	"As"	74.9
1300	DATA	"Selenium"	"Se"	79
1350	DATA	"Bromine"	"Br"	79.9
1400	DATA	"Krypton"	"Kr"	83.8
1450	DATA	"Rubidium"	"Rb"	85.5
1500	DATA	"Strontium"	"Sr"	87.6
1550	DATA	"Yttrium"	"Y"	88.9
1600	DATA	"Zirconium"	"Zr"	91.2
1650	DATA	"Niobium"	"Nb"	92.9
1700	DATA	"Molybdenum"	"Mo"	95.9
1750	DATA	"Technetium"	"Tc"	99
1800	DATA	"Ruthenium"	"Ru"	101.1
1850	DATA	"Rhodium"	"Rh"	102.9
1900	DATA	"Palladium"	"Pd"	106.4
1950	DATA	"Silver"	"Ag"	107.9
2000	DATA	"Cadmium"	"Cd"	112.4
2050	DATA	"Indium"	"In"	114.8
2100	DATA	"Tin"	"Sn"	118.7
2150	DATA	"Antimony"	"Sb"	121.8
2200	DATA	"Tellurium"	"Te"	127.6
2250	DATA	"Iodine"	"I"	126.9
2300	DATA	"Xenon"	"Xe"	131.3
2350	DATA	"Cesium"	"Cs"	132.9
2400	DATA	"Barium"	"Ba"	137.3
2450	DATA	"Lanthanum"	"La"	138.9
2500	DATA	"Cerium"	"Ce"	140.1
2550	DATA	"Praseodymium"	"Pr"	140.9

2600	DATA	"Neodymium"	"Nd"	144.2
2650	DATA	"Promethium"	"Pm"	147
2700	DATA	"Samarium"	"Sm"	150.4
2750	DATA	"Europium"	"Eu"	152
2800	DATA	"Gadolinium"	"Gd"	157.3
2850	DATA	"Terbium"	"Tb"	158.9
2900	DATA	"Dysprosium"	"Dy"	162.5
2950	DATA	"Holmium"	"Ho"	164.9
3000	DATA	"Erbium"	"Er"	167.3
3050	DATA	"Thulium"	"Tm"	168.9
3100	DATA	"Ytterbium"	"Yb"	173
3150	DATA	"Lutetium"	"Lu"	175
3200	DATA	"Hafnium"	"Hf"	178.5
3250	DATA	"Tantalum"	"Ta"	181
3300	DATA	"Tungsten"	"W"	183.8
3350	DATA	"Rhenium"	"Re"	186.2
3400	DATA	"Osmium"	"Os"	190.2
3450	DATA	"Iridium"	"Ir"	192.2
3500	DATA	"Platinum"	"Pt"	195.1
3550	DATA	"Gold"	"Au"	197
3600	DATA	"Mercury"	"Hg"	200.6
3650	DATA	"Thallium"	"Tl"	204.4
3700	DATA	"Lead"	"Pb"	207.2
3750	DATA	"Bismuth"	"Bi"	209
3800	DATA	"Polonium"	"Po"	210
3850	DATA	"Astatine"	"At"	210
3900	DATA	"Radon"	"Rn"	222
3950	DATA	"Francium"	"Fr"	223
4000	DATA	"Radium"	"Ra"	226
4050	DATA	"Actinium"	"Ac"	227
4100	DATA	"Thorium"	"Th"	232
4150	DATA	"Protactinium"	"Pa"	231
4200	DATA	"Uranium"	"U"	238
4250	DATA	"Neptunium"	"Np"	237
4300	DATA	"Plutonium"	"Pu"	242
4350	DATA	"Americium"	"Am"	243
4400	DATA	"Curium"	"Cm"	247
4450	DATA	"Berkelium"	"Bk"	247
4500	DATA	"Californium"	"Cf"	251
4550	DATA	"Einsteinium"	"Es"	254
4600	DATA	"Fermium"	"Fm"	253
4650	DATA	"Mendelevium"	"Md"	258
4700	DATA	"Nobelium"	"No"	254
4750	DATA	"Lawrencium"	"Lr"	262
4800	DATA	"Kurchatovium"	"Ku"	265

PLUS CLUB

— 20% Discount on Software
— 10% Discount on selected hardware

All prices include VAT. Where marked * please add 6.00 for delivery. Your annual subscription guarantees 20% discount off all new titles added to our list (this is updated weekly), and special prices on selected peripherals. If you do not wish to join the club, any product may be ordered at the standard price.

SOFTWARE

BBC B

Standard Membership

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

COMMODORE 64 SOFTWARE

Standard Membership

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

SPECTRUM SOFTWARE

Standard Membership

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

COMPUTERS — the discount offered

BBC Model B with cassette recorder

5.5 software titles

Commodore 64

Spectrum 486

Memotech MTX 500

Ami 400

PRINTERS — the discount offered

Epson FX80

Epson RX80 F T

Epson RX80

Epson C800

Canon PW1000A

Price includes printer cable for most popular models

Please state make of computer when ordering

Standard Membership

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Price

Send orders to PLUS CLUB, 12 York St, Bath, Avon, BA1 1NG. ■ paying by Access/Barclaycard, we can accept telephone orders on 0225-61675 (24 hour answer service)

Please supply me with

Make of Micro

Price

Name

Address

I enclose cheque/p.o. for

£.....payable to Plus Club

Please debit my Access/Barclaycard

No

Prices apply ■ UK only

We aim to supply items by return, but please allow 10 days for delivery.

Add delivery for hardware (delete if not applicable)

8.00

Add subscription (if ordering at club prices)

10.00

TOTAL

Signed

... NOW AVAILABLE ...
... NOW AVAILABLE ...



RICHARD SHEPHERD SOFTWARE

WANTED

POTENTIAL MILLIONAIRES

Video Vault International are now looking for additional quality games to market through their international network, so if you're a talented programmer send your

SPECTRUM - COMMODORE 64 - ARCADE GAMES
in machine code (basic games considered)

**OUTRIGHT PURCHASE/ROYALTIES
BY NEGOTIATION**

**SEND YOUR TAPES AND INSTRUCTIONS
(mark envelope confidential) TO US NOW IN
STRICTEST CONFIDENCE TO
THE SOFTWARE DEVELOPMENT MANAGER:**

VideoVault

140 High Street West, Glossop, Derbyshire.
Telephone: Glossop 66555.

Kentech

A touch above the rest

HOLDERS OF THE LARGEST RANGE OF COMPUTER ACCESSORIES.

Joystick and Accessories

Pro-Ace Joystick	12.95
Crackshot Joystick	8.95
Quickshot 1 Joystick	9.95
Quickshot 2 Joystick	10.95
□p Stick Atari	14.95
Dragon	16.95
B.B.C.	17.95
(Free Graphic Software)	
DK Tronics Spectrum	12.95
Dual Port Interface	
Protek II Spectrum	18.95
Switchable Interface	
ProLink B.B.C. (B)	9.95
Programmable Interface	

Printer Accessories

Kempston Spectrum Centronics	
Interface Soft Driven	39.95
Port Driven	54.95

ZX Print 3 Spectrum Centronics	
Interface Rom Driven	34.95
RS 232 or Centronics Cable	
for Above	9.95
VIC 20/64 Centronics	
Printer Lead	29.95
Dragon Oric Centronics	
Printer Lead	14.95
B.B.C. Centronics Printer Lead	14.95

Voice Synthesizers

Cheetah Sweet Talker Spectrum	29.75
Cheetah Sweet Talker B.B.C.	24.95
Adman VIC 20 Voice Synth	49.95
Adman CMB 64 Voice Synth	29.95
Currah Spectrum Voice Synth	29.95

Miscellaneous

Datex VIC 20/64 Cassette Deck	39.95
Sound Module for Spectrum	12.95
Vixen VIC 20 16K	
Switchable Rampack	34.95
Vixen VIC	
Switchable Motherboard	31.95
New DK Tronics keyboard for Spectrum	44.95
DK Tronics Keyboard	
Spectrum/ZX-81	42.95
Cheetah 32K Ram Pack 16K Spectrum	39.95
Keyboard Overlays Vic 20/Dragon	4.95
Keyboard Overlays B.B.C./CBM 64	5.95
Graphic Pads Spectrum	1.95
Graphic Pads B.B.C.	3.95
CT5 Data Cassettes (High Quality)	50
Dragons Eye Power Indicator	3.95
Soft Covers (High Quality) for Spectrum	2.95
VIC 20/64, Oric, B.B.C.	
Dragon, Atari 800 DXL	4.45
Hard Covers VIC 20/64	8.95
B.B.C.	9.95

ALL PRICES INCLUDE VAT

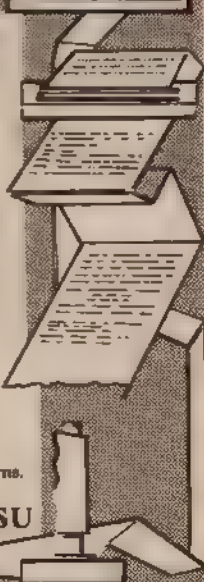
Postal Insurance Free • Delivery Free • FREE TWO C15 DATA CASSETTES with every item dispatched before 31st July, 1984

ALL items in stock at time of going to press. • GOODS despatched on clearance of cheque. • Full Guarantee on all items.

Normal Delivery Time - 7 Days. • Trade Enquiries Welcome.

ST. OSWALDS ROAD TRADING ESTATE, GLOUCESTER, GL1 2SU

Telephone: (0452) 415002 Telex: 43514



Graphically filed

Neil Barnes presents a multi-purpose facility program for BBC with 1.2 operating system

This is a sophisticated File program designed to make use of Mode 7 BBC graphics. It has many of the features found in commercial business filing systems.

The main intention was to make the program as user friendly and error trapped as possible. For example, if you try to print a file that does not exist you will be returned

to the main menu. Files can be sorted into alphabetical order and printed out on any parallel printer. Printer dumps can be alphabetical or numerical.

The program will keep you informed of the amount of space left for new files and verify your entries if required.

The search routine will discover any

sequence of letters you choose even if it is embedded in a longer string, eg, Fred will be found from John Fred Smith and so on. There are View options which enable you to see part or all of the completed file. The program is well illustrated by Rem statements so the general structure of the program should be fairly clear.

The main sections of the program are achieved by use of Procedures - a complete list of these and their functions will follow in part two next week.

```

10 REM ***GRAPHICALLY FILED PROGRAM***
20 REM ** FILEKEEPER **
30 REM ** FILE MANAGER **
40 REM ** FOR NEW MAY 84 **
50 REM ** THOMPSON TO USE **
60 REM ** TOOLKIT FOR 1140 **
70 REM ** RE-ANALYSIS **
80 REM *****
90 REM Initialisation area
100 ON ERROR GOTO 110
110 GOTO 120
120 REM Set display mode
130 MODE 7
140 REM Turn cursor off
150 PRINT:GOTO 160
160 REM
170 PROCmain
180 GOTO 190
190 PROCtitle="FILEKEEPER",13,
200 FOR L=1 TO 2
210 PRINTTAB(1,1,9,11)..."
220 NEXT
230 REM Read data into array
240 FOR M=1 TO 2
250 READ (X(M))
260 NEXT
270 REM Read data printer
280 PRINT:FOR
290 FOR M=1 TO 2
300 PRINTTAB(1,1,9,11)..."
310 NEXT
320 VDU1,1,16,11:PRINT:GOTO 330
330 DATA Create a new file,add items to file,Verify file,dump file to printer
Sort file,Search for item in file,quit file
340 VDU1,2,20,1:PRINT:Please input your choice"
350 G=GET
360 IF AS=1 THEN PROCnew
370 IF LEN(G)=1 THEN G=1:GOTO 380
380 VDU1,2,20,1:PRINT:at
390 VDU1,1,16,11
400 IF V=1 OR V=2 THEN PRINTTAB(1,1,9,11)..."
410 PROCdecide
420 DEFPROCdecide
430 END
440 FOR L=1 TO 2:PRINTTAB(1,1,9,11)..."
450 ENDPROC
460 DEFPROCdecide
470 REM Decide which option
480 IF V=1 THEN PROCnewfile
490 IF V=2 THEN PROCadd
500 IF V=3 THEN PROCsearch
510 IF V=4 THEN PROCview
520 IF V=5 THEN PROCprint
530 IF V=6 THEN PROCquit
540 DEFPROCnewfile
550 PROCtitle="NEW FILE",11,
560 VDU1,1,16,11:PRINT:if there is already a file in memory"
570 VDU1,1,16,11:PRINT:then creating a new one will erase"
580 VDU1,1,16,11:PRINT:the existing file."
590 PRINT
600 VDU1,1,16,11:PRINT:do you still wish to create a new file?"
610 G=GET
620 IF AS=V OR AS=1 THEN PROCnewdata
630 IF AS=1 OR AS=2 THEN PROCnew
640 STOP
650 DEFPROCnewdata
660 PROCtitle="INPUTTING THE DATA",11,
670 REM
680 PRINT
690 VDU1,1,16,11:PRINT:please give the new file a title."
700 PRINT
710 VDU1,1,16,11:PRINT:maximum 7 characters."
720 PRINT
730 VDU1,1,16,11:PRINT:TITLE OF NEW FILE:"
740 REPEAT
750 INPUTTAB(1,1,9,11)..."
760 IF LEN(G)=1 THEN G=1:GOTO 770
770 IF LEN(G)=1 THEN G=1:GOTO 770
780 IF LEN(G)=1 THEN G=1:GOTO 770

```


NOT JUST A PRETTY ~~FACE~~ ^{Inter}FACE!

Programmable Joystick Interface



This superb new interface is one of our very latest developments for your Spectrum. Offering even more features, and as it's programmable from the keyboard or with the cassette supplied you can now use it with any software.

Features include

- Eight directional movement
- Keyboard fully functional
- Rear connector for other add-ons
- Microdrive compatible



ONLY
£22.95

Quickshot Joystick I*

- Super positive response
- Stabilizing suction caps
- 2 fire buttons
- 4ft lead

ONLY
£9.99

Please rush me the following

..... Programmable joystick interface	of £
..... Quickshot Joystick I	of £
..... Quickshot Joystick II	of £

Please add post and packing £1.25

I enclose cheque/PO/Cash for Total £

or debit my Access/Barclaycard No.

Signature _____

Name _____

Address _____

PCW285

Quickshot Joystick II*

Incorporating all the features of 'Quickshot I' plus

- Improved control grip
- Trigger fire button
- Rapid fire option

ONLY
£12.95

DK Tronics Ltd., Unit 6, Shire Hill Industrial Estate, Saffron Walden,
Essex CB11 3AQ. Telephone: (0799) 26350 (24 hrs) 1 lines

The Spectrum Connection

WHO WILL JOIN THE EVIL DEAD NEXT?

FROM BRITAIN'S MOST
POPULAR HORROR FILM
COMES A MOST
FASCINATING COMPUTER GAME

A FAST MOVING GAME
OF SKILL AND STRATEGY
FOR THE COMMODORE 64

THE

EVIL DEAD

THE GAME THAT GUARANTEES SLEEPLESS NIGHTS!

AVAILABLE FROM
ALL GOOD COMPUTER
GAMES STOCKISTS INCLUDING
THE VIDEO PALACE
100 OXFORD STREET, LONDON W1.



DISTRIBUTED BY
PALACE VIRGIN GOLD
69 FLEMINGTON ROAD,
LONDON E7 0 7NL
TELEPHONE 01-539 5565



**A RARE OPPORTUNITY TO BECOME A
PROGRAMMER FOR A LEADING
SOFTWARE HOUSE**

**PROGRAMMERS
PROGRAMMERS
PROGRAMMERS**

**REQUIRED FOR COMMODORE 64 AND
ANY Z80 BASED MACHINES**

**PROGRAMMERS MUST HAVE AN
EXCELLENT COMMAND OF MACHINE CODE
AND IT IS ESSENTIAL THAT YOU ARE
AWARE OF THE IMPORTANCE OF GOOD
GRAPHICS**

*IN THE FIRST INSTANCE WRITE ENCLOSING A SMALL
SAMPLE OF YOUR STANDARD OF PROGRAMMING*

**TO: SOFTWARE DEVELOPMENT MANAGER
ANIROG SOFTWARE LTD.
29 WEST HILL
DARTFORD
KENT**

FOR CASSETTE AND DISK DUPLICATION

There's only one answer — BiBi Magnetix are the company who do it all, reliably — AND on time — Check this for unbeatability

CASSETTE DUPLICATION

- ★ Special Master Enhancement Techniques
- ★ High Speed Duplication onto the finest available tapes
- ★ 2-Stage Quality Control
- ★ Specially modified Beta Shells only
- ★ Design & Print all arranged (if needed)
- ★ On-body printing or labelling
- ★ Overwrapping with tearstrip
- ★ All special packaging, shrinkwrapping, blister-carding
- ★ Stocking, Distribution, etc., etc.

DISK DUPLICATION

- ★ 3 1/2", 5 1/4", 8" all duplicated (+ 3" Autumn '84)
- ★ All Formats/Operating Systems
- ★ Special Format Modifications/Anti-Piracy assistance
- ★ Use our Media, or your own
- ★ All duplicates 100% Verified exact copies of Source Disk
- ★ Design & Print — labels, envelopes arranged
- ★ Auto-labelling, sealed poly-bagging
- ★ All special packaging, shrinkwrapping, etc.
- ★ Stocking, Distribution, etc., etc.

That's why BiBi MAGNETICS promises NO BAD MEMORIES

For a full quotation, call NIGEL BOYLE

01-575 7117

Field Way

Greenford Ind. Estate

Greenford, Middx.

UB6 8UN

BiBi
MAGNETICS LIMITED

COMMODORE 64

**OXFORD
PASCAL**

**YOUR
FUTURE WITH
COMPUTERS
DEPENDS ON PASCAL**

BECAUSE

- PASCAL is the world's most popular programming language after BASIC
- PASCAL is FAST — up to 20 times the speed of BASIC

WHAT IS OXFORD PASCAL?

OXFORD PASCAL is a COMPLETE implementation of the popular programming language PASCAL running on the Commodore 64

GRAPHICS & SOUND

With the OXFORD extensions to PASCAL you can programme dazzling graphics and astounding sound

WHAT DO I GET?

With the cassette version of OXFORD PASCAL you get

- A powerful text editor for preparing PASCAL programs
- A resident compiler giving 14k of user RAM
- A powerful set of colour graphics and sound extensions to standard PASCAL

With the disk version of OXFORD PASCAL you get

- All the above, PLUS
- A full disk to disk compiler exploiting the entire memory of the 64 for PASCAL programs

HOW MUCH DOES OXFORD PASCAL COST?

Cassette version (resident compiler only) £14.95

Full disk compiler (1541, 4040, 8050,

8250 drives) £49.95

Prices are exclusive of VAT. There is also a small charge for post and packing



Oxford Computer Systems
(Software) Ltd

• Kensington Road,
Woodstock

Osney OX1 1JR, England

Telephone (0993) 812700
Telex B3147 ROL OCSL

The QL philosophy

Andy Pennell takes a look at the QL Parallel Printer Interface from Miracle Systems

As the QL regrettably only has a serial interface for printers, the release of a parallel interface from Miracle Systems would seem to be very useful. It consists of a small white box with a cable that plugs into Serial Port 1 on the QL, and a Centronics type plug for the printer. As it is a hardware-only device, it requires no software and should, in theory, be 100% compatible with any Centronics printer.

The supplied instructions are brief, not even mentioning the device name that should be used. To use from BASIC, a stream must first be opened, with something like open #3, ser 1. For printout or listings the normal commands are used, but with #3 inserted; eg. Print # 3. The first interface supplied for review, a production device, didn't work at all well. When producing listings, characters were missed out, and screen dumps were hopeless. After contacting Miracle Systems, a 'design change' was made, and a revised interface supplied.

This was a great improvement, and worked very successfully. It handled Print, List, print outs from Quill, and even the

high-res screen dumps from Easel. Even at 9600 baud printouts from the serial connection to the printer interface makes things slow, but that is not Miracle's fault. A generous three metres of cable is included with the device.

This interface seems to follow the QL philosophy, by being first advertised, then

manufactured, released in a non-working version, then revised due to customer response.

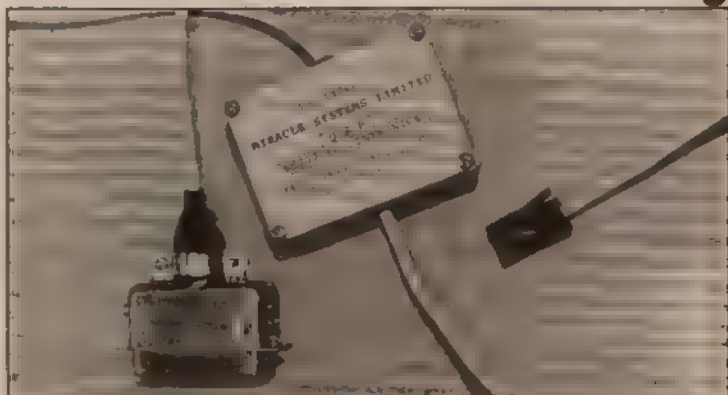
Now it is working, though, it is very neat, requires no power supply, is easy to use, and is reasonably priced. Anyone else who first received a faulty interface can apparently now get a rapid replacement.

Device: QSP Parallel Printer Interface

Micro: QL

Price: £49.00

Supplier: Miracle Systems, 6 Armitage Way, Kings Hedges, Cambridge CB4 2UE.



GOLD CREST MAIL ORDERS ONLY 9 WINCHESTER ST. LONDON W.3 TOP-SAVINGS

COMPUTERS:

ZXSPECTRUM 16K £3.00 48K £118.00
COMMODORE 64 64K £188.00
BBC MICRO 32K £389.00

SPECTRUM SOFTWARE:

Hulk, Sabre Wulf, Lords of Midnight, R.R.P. £9.95 O.R.P. £13.50. Mugsy R.R.P. £6.95 O.R.P. £5.85. Antica R.R.P. £6.95 O.R.P. £5.75. Jack & The Beanstalk R.R.P. £6.95 O.R.P. £4.90. Ad Astra, Tutenkamen, Kosmic Kanga, Pengy, Harrier Attack, Wheelie, Cavern Fighter, Manic Miner, Tribble Trouble, Blue Thunder, R.R.P. £5.95 O.R.P. £4.90. Atic Atac, Beaky & The Eggknatchers, R.R.P. £5.50 O.R.P. £4.80. Paytron R.R.P. £7.95 O.R.P. £6.50. Pyramid R.R.P. £5.50 O.R.P. £4.85. Doomday Castle R.R.P. £6.50 O.R.P. £5.75. Deathchase, Code Name Mat, Scuba Dive, Las Filas, Skull, Penetrator, Football Manager R.R.P. £6.95 O.R.P. £5.75. Jungle Trouble, Cyberzone R.R.P. £5.50 O.R.P. £4.60. Android Two R.R.P. £5.95 O.R.P. £4.80. Blade Alley R.R.P. £5.95 O.R.P. £5.20. Gilligan's Gold R.R.P. £5.90 O.R.P. £4.80. Moon Alert R.R.P. £5.90 O.R.P. £5.20. Pogo R.R.P. £5.90 O.R.P. £4.85. Hunchback R.R.P. £5.90 O.R.P. £4.80. Mr Wimpy R.R.P. £5.90 O.R.P. £5.20. Jet Set Willy R.R.P. £5.95 O.R.P. £4.95. Time Bomb II R.R.P. £5.95 O.R.P. £4.80. Trishman R.R.P. £5.95 O.R.P. £4.70. Chequered Flag R.R.P. £5.95 O.R.P. £5.40. Night Gunner R.R.P. £6.95 O.R.P. £5.60. Timegate R.R.P. £6.95 O.R.P. £5.40. Fred, 3-D Ant Attack, Bugaboo, Snowman R.R.P. £6.95 O.R.P. £5.80. Flight Simulation R.R.P. £7.95 O.R.P. £7.20. Hobbit, Valhalla R.R.P. £14.95 O.R.P. £10.95. Classic Adventure R.R.P. £6.95 O.R.P. £5.75.

COMMODORE SOFTWARE:

Hulk, Beech-Head, R.R.P. £9.95 O.R.P. £8.50. Loco, Bigger, Son of Bigger, 737 Flight Path, Cybertron R.R.P. £7.95 O.R.P. £6.20. Sheep in Space R.R.P. £7.50 O.R.P. £6.40. Cavalon R.R.P. £5.90 O.R.P. £5.70. Attack/Revenge of Mutant Camels R.R.P. £7.50 O.R.P. £6.40. Hellgate R.R.P. £5.00 O.R.P. £4.00. Gldrunner R.R.P. £5.00 O.R.P. £4.20. Quark R.R.P. £7.95 O.R.P. £6.80. Scuba Dive R.R.P. £6.95 O.R.P. £5.80. Las Filas R.R.P. £7.95 O.R.P. £6.80. Space Pilot R.R.P. £7.95 O.R.P. £6.80. Superpipeline R.R.P. £6.90 O.R.P. £5.60. Bozo's Night Out R.R.P. £6.90 O.R.P. £5.75. Solo Flight R.R.P. £14.95 O.R.P. £11.95. Voodoo Castle, Snowball, R.R.P. £9.95 O.R.P. £8.00. Odyssey R.R.P. £6.95 O.R.P. £5.80. Hobbit 64 R.R.P. £14.95 O.R.P. £10.95. Colossal Adventure R.R.P. £9.95 O.R.P. £8.00. Transylvanian Tower R.R.P. £6.50 O.R.P. £5.20. Tales of Arabian Nights R.R.P. £7.00 O.R.P. £5.95.

THE LAST FOUR LINES ON STOCK, ORDERS UNDER £10.00, 28 DAYS FOR DELIVERY AND CONTACT BE MENTIONED AS BEFORE.

commodore

A TYPICAL COMMODORE 64 OWNER WAITING FOR A PROGRAM TO LOAD

Zzzzzz NOT ANY MORE RIPSPEED IS HERE!!!

LOOK AT THESE LOADING TIMES!

Normal rate	Disc Drive	With Ripspeed
11 min 20 sec	1 min 40 sec	80 sec

This new utility allows you to load your programs at 10 times normal speed. This program works with both Basic and machine code.

Why pay £200.00 for a disc drive when for £7.95 you can buy a Ripspeed, it comes with full instructions on how to convert programs to fast load.

FROM THE SAME FACTORY AS THE C2N THE
SUPER SAVER 20/64 DATA RECORDER
(NO INTERFACE REQUIRED) **£29.95**

COMMODORE 64 TAPE TO DISK TRANSFER UTILITY **£9.95**

ATARI ALL MODELS TAPE TO DISK TRANSFER UTILITY **£9.95**

BBC TAPE TO DISK TRANSFER UTILITY **£9.95**

MICRO CENTRE

BRIDGE STREET

EVESHAM

WORCHESTERSHIRE

Tel: 0386 49641

MICRO CENTRE

1756 PERSHORE ROAD

COTTERIDGE

BIRMINGHAM

Tel: 021-458 4564

HUGE RANGE OF SOFTWARE & BOOKS FOR BBC, ELECTRON, SPECTRUM, COMMODORE 64, VIC 20, DRAC, DRAGON, MEMOTECH & ZX81

Mail Order to Evensham Shop please.

All prices inclusive Goods sent anywhere.

Cheque PO Bank Draft or phone your card number



An edited version

Simon Wallace demonstrates a cassette-based word processor

Anyone who has a Commodore 64 and a Printer can use this cassette-tape based word processor. The system is no toy — it has all the basic facilities required for word processing. It was designed to work efficiently, but to be comparatively easy to use and to understand. The following paragraphs examine the requirements of a word processing system, the design criteria employed, the implementation of the system and how to use the *PCW-C64-WP*.

Word Processing

Any word processor is in reality a micro-computer, often with less technical capability than your Commodore 64. It runs a single program to store data typed on the keyboard and print it out on request. The program will be enormously complex to deal with the dozens of specialised requirements of word processing. The micro-computer will often have special hardware features such as a high-quality printer, specially-labelled keys and a TV screen the same 'A4' shape as a normal business letter.

The most important function of a word processor is text editing. The user must be able to juggle the words in any manner desired. The method employed is known as a screen editor. With this any item shown on the screen can be changed. Extra text can be inserted or unwanted text deleted. This is in contrast to the line editor such as the Basic program editor of the Commodore 64. In a line editor, text is added, deleted or changed a line at a time.

The standard paper is about 80 characters wide, but there is often a need to produce wider documents. Some editors can scroll sideways so that a longer line can be accessed. The same idea can be used to scroll up and down on the screen, giving more than a single screen to edit. In fact, the screen editor has then become an entire text editor where the operator can manipulate the whole file at one time.

However, it would be tiresome if the operator had to adjust all the following text if only part of a line is added. All word processors have features to reformat the text to any given width and margin. Format routines may include columns and other special layouts. Usually special symbols are used on the screen to indicate the layout. Some word processors have the ability to mark and then manipulate blocks of data.

Other features of the editor will relate to printing. Special symbols are used to select functions of the printer. These control characters will affect line spacing, starting a new page and any character-set options. A

very common use is to select bold characters for headings. Character set features may include special symbols such as mathematical notation or common graphic characters.

This is all very well, but it is important to bear in mind the abilities of the hardware. Some machines connect to an enormous variety of printers such as laser printers, microfiche and typesetters. Often a word processor is connected to a communications network which offers many difficult forms of output including output to another machine's screen (electronic mail). However, the typical machine has only its own printer attached. Usually this will be a high-quality printer of the daisy-wheel type, which is limited to standard character sets.

There are other aspects of a word processing system than editing and printing. Facilities are provided to store and retrieve data. File maintenance software will take security copies and keep indices. Some manufacturers also offer spelling checkers to highlight words not in the vocabulary. Another common feature is to produce standard letters given a list of the variable data; for example, a list of names and addresses. Finally, the most complex refinement offered by some systems is to do all the above for several screens sharing the same printers and other hardware.

Design of the PCW-C64-WP

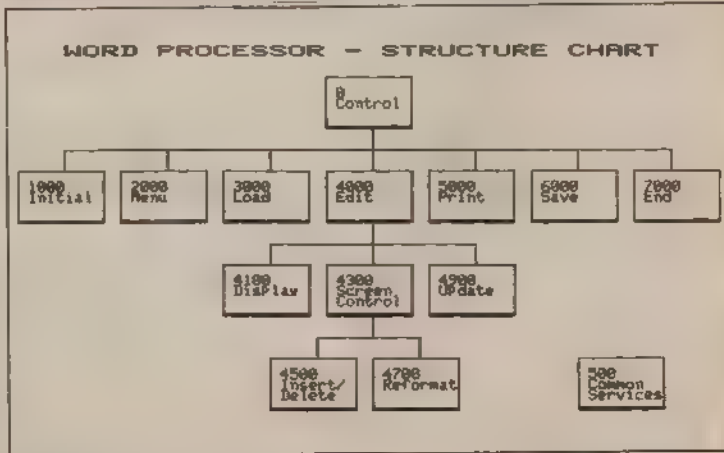
This word processor was designed to be entirely coded in Basic. By doing so, the program is quick to implement, easy to understand and simple to extend. However, there are two major drawbacks. Firstly, Basic is relatively slow, so it is necessary to use whole line input and output to the

screen. This means that lines must be marked by inverted commas if leading spaces or punctuation are present. This is done automatically by the program. Secondly, Commodore 64 Basic can not be made infallible or break-proof. The system can be broken by the *Run Stop* key, or by typing invalid characters on the screen. (Never use double inverted commas in your text!) There is a way to restart the program without losing your data, but it is unsatisfactory that Basic does not permit the program to trap its own errors and recover.

It is designed with sufficient structure for its level of complexity, with a control module which first calls the initialise routine and then offers the menu, followed by whichever option is selected. This sequence of menu then option is repeated until the *Finish* option is selected. The program loads and saves data files on cassette tape. (You may wish to make your first change to the system so that it will also handle disc files.) These routines can handle all or part of the data. The save routine can also read back the file to verify the tape.

The print routine prints to a printer on channel 4 or 5, or to the TV screen. The TV option permits the user to view the finished layout without printing. All or part of the data may be printed, and several layout options are available. A standard margin can be added to each line, and each line can be numbered. This latter feature is useful in selecting which line numbers are required for editing, part printing or part saving. A page length can be given which dictates how many lines to print continuously. A page gap is then specified to control how many blank lines to print between pages. Alternatively, the program will pause while the paper is lined up manually. Special print control characters are available to start a new page (↑) and to indicate a blank line (↵).

The major part of the program is the screen editor. The design is similar to most screen editors on mainframe computers. The user specifies where to start in the file



and how much data to show on the screen. This data is changed using the keyboard, including the *Insert* and *Delete* keys. Logical lines can be up to 80 characters which is two lines on the screen. As with the Basic line editor, the computer remembers which lines are linked in this way. When the text is as required, the *F7* key is used to finish the edit. If the edit is not aborted, whatever is now on the screen replaces the lines originally displayed.

Special functions are available to assist in the addition or deletion of text. The *F3* function will reformat the text to a given width, allowing for any additional margin required. (Note that new page and blank

line characters are not affected.) *F5* causes an additional blank line to be available at the current position of the cursor. *F6* deletes a line from the screen at the current cursor position. *F7* moves the cursor to the start of the next logical line without ending the current line. The *Return* key is used at the end of a line. It will terminate the line at that point, disregarding any subsequent text.

Next week, we will take a more detailed look at how to use the *PCW-C64-WP*.

Operator's Notes

F1 End Edit
F3 Reformat text
F6 Delete line

(*F6* = shift+5)
F7 Go to next logical line
Use *Return* key at end of line
← Visible blank line
↑ Start new page

Defaults:

Edit starts at end of file
displays 0 lines
Print Load and Save
start at record 1
end at end of file
Print page gap—pause option
device—TV screen
margin = 0
no line numbering

Reformat to width 70 & margin 0 if you break
Basic enter GOTO 999

WORD PROCESSOR BY SIMON WALLACE

```

0 REM
1 REM "VERSION 20"
2 REM
3 REM....."CONTROL MODULE"
4 REM
5 REM....."COMMON SERVICE ROUTINES"
6 REM
7 REM....."LOAD ROUTINE"
8 REM
9 REM....."EDIT"
10 REM
11 REM....."SAVE"
12 REM
13 REM....."FINISH"
14 REM
15 REM....."REFORMAT"
16 REM
17 REM....."DELETE"
18 REM
19 REM....."END EDIT"
20 REM
21 REM....."REFORMAT"
22 REM
23 REM....."DELETE"
24 REM
25 REM....."END EDIT"
26 REM
27 REM....."REFORMAT"
28 REM
29 REM....."DELETE"
30 REM
31 REM....."END EDIT"
32 REM
33 REM....."REFORMAT"
34 REM
35 REM....."DELETE"
36 REM
37 REM....."END EDIT"
38 REM
39 REM....."REFORMAT"
40 REM
41 REM....."DELETE"
42 REM
43 REM....."END EDIT"
44 REM
45 REM....."REFORMAT"
46 REM
47 REM....."DELETE"
48 REM
49 REM....."END EDIT"
50 REM
51 REM....."REFORMAT"
52 REM
53 REM....."DELETE"
54 REM
55 REM....."END EDIT"
56 REM
57 REM....."REFORMAT"
58 REM
59 REM....."DELETE"
60 REM
61 REM....."END EDIT"
62 REM
63 REM....."REFORMAT"
64 REM
65 REM....."DELETE"
66 REM
67 REM....."END EDIT"
68 REM
69 REM....."REFORMAT"
70 REM
71 REM....."DELETE"
72 REM
73 REM....."END EDIT"
74 REM
75 REM....."REFORMAT"
76 REM
77 REM....."DELETE"
78 REM
79 REM....."END EDIT"
80 REM
81 REM....."REFORMAT"
82 REM
83 REM....."DELETE"
84 REM
85 REM....."END EDIT"
86 REM
87 REM....."REFORMAT"
88 REM
89 REM....."DELETE"
90 REM
91 REM....."END EDIT"
92 REM
93 REM....."REFORMAT"
94 REM
95 REM....."DELETE"
96 REM
97 REM....."END EDIT"
98 REM
99 REM....."REFORMAT"
100 REM
101 REM....."DELETE"
102 REM
103 REM....."END EDIT"
104 REM
105 REM....."REFORMAT"
106 REM
107 REM....."DELETE"
108 REM
109 REM....."END EDIT"
110 REM
111 REM....."REFORMAT"
112 REM
113 REM....."DELETE"
114 REM
115 REM....."END EDIT"
116 REM
117 REM....."REFORMAT"
118 REM
119 REM....."DELETE"
120 REM
121 REM....."END EDIT"
122 REM
123 REM....."REFORMAT"
124 REM
125 REM....."DELETE"
126 REM
127 REM....."END EDIT"
128 REM
129 REM....."REFORMAT"
130 REM
131 REM....."DELETE"
132 REM
133 REM....."END EDIT"
134 REM
135 REM....."REFORMAT"
136 REM
137 REM....."DELETE"
138 REM
139 REM....."END EDIT"
140 REM
141 REM....."REFORMAT"
142 REM
143 REM....."DELETE"
144 REM
145 REM....."END EDIT"
146 REM
147 REM....."REFORMAT"
148 REM
149 REM....."DELETE"
150 REM
151 REM....."END EDIT"
152 REM
153 REM....."REFORMAT"
154 REM
155 REM....."DELETE"
156 REM
157 REM....."END EDIT"
158 REM
159 REM....."REFORMAT"
160 REM
161 REM....."DELETE"
162 REM
163 REM....."END EDIT"
164 REM
165 REM....."REFORMAT"
166 REM
167 REM....."DELETE"
168 REM
169 REM....."END EDIT"
170 REM
171 REM....."REFORMAT"
172 REM
173 REM....."DELETE"
174 REM
175 REM....."END EDIT"
176 REM
177 REM....."REFORMAT"
178 REM
179 REM....."DELETE"
180 REM
181 REM....."END EDIT"
182 REM
183 REM....."REFORMAT"
184 REM
185 REM....."DELETE"
186 REM
187 REM....."END EDIT"
188 REM
189 REM....."REFORMAT"
190 REM
191 REM....."DELETE"
192 REM
193 REM....."END EDIT"
194 REM
195 REM....."REFORMAT"
196 REM
197 REM....."DELETE"
198 REM
199 REM....."END EDIT"
200 REM
201 REM....."REFORMAT"
202 REM
203 REM....."DELETE"
204 REM
205 REM....."END EDIT"
206 REM
207 REM....."REFORMAT"
208 REM
209 REM....."DELETE"
210 REM
211 REM....."END EDIT"
212 REM
213 REM....."REFORMAT"
214 REM
215 REM....."DELETE"
216 REM
217 REM....."END EDIT"
218 REM
219 REM....."REFORMAT"
220 REM
221 REM....."DELETE"
222 REM
223 REM....."END EDIT"
224 REM
225 REM....."REFORMAT"
226 REM
227 REM....."DELETE"
228 REM
229 REM....."END EDIT"
230 REM
231 REM....."REFORMAT"
232 REM
233 REM....."DELETE"
234 REM
235 REM....."END EDIT"
236 REM
237 REM....."REFORMAT"
238 REM
239 REM....."DELETE"
240 REM
241 REM....."END EDIT"
242 REM
243 REM....."REFORMAT"
244 REM
245 REM....."DELETE"
246 REM
247 REM....."END EDIT"
248 REM
249 REM....."REFORMAT"
250 REM
251 REM....."DELETE"
252 REM
253 REM....."END EDIT"
254 REM
255 REM....."REFORMAT"
256 REM
257 REM....."DELETE"
258 REM
259 REM....."END EDIT"
260 REM
261 REM....."REFORMAT"
262 REM
263 REM....."DELETE"
264 REM
265 REM....."END EDIT"
266 REM
267 REM....."REFORMAT"
268 REM
269 REM....."DELETE"
270 REM
271 REM....."END EDIT"
272 REM
273 REM....."REFORMAT"
274 REM
275 REM....."DELETE"
276 REM
277 REM....."END EDIT"
278 REM
279 REM....."REFORMAT"
280 REM
281 REM....."DELETE"
282 REM
283 REM....."END EDIT"
284 REM
285 REM....."REFORMAT"
286 REM
287 REM....."DELETE"
288 REM
289 REM....."END EDIT"
290 REM
291 REM....."REFORMAT"
292 REM
293 REM....."DELETE"
294 REM
295 REM....."END EDIT"
296 REM
297 REM....."REFORMAT"
298 REM
299 REM....."DELETE"
300 REM
301 REM....."END EDIT"
302 REM
303 REM....."REFORMAT"
304 REM
305 REM....."DELETE"
306 REM
307 REM....."END EDIT"
308 REM
309 REM....."REFORMAT"
310 REM
311 REM....."DELETE"
312 REM
313 REM....."END EDIT"
314 REM
315 REM....."REFORMAT"
316 REM
317 REM....."DELETE"
318 REM
319 REM....."END EDIT"
320 REM
321 REM....."REFORMAT"
322 REM
323 REM....."DELETE"
324 REM
325 REM....."END EDIT"
326 REM
327 REM....."REFORMAT"
328 REM
329 REM....."DELETE"
330 REM
331 REM....."END EDIT"
332 REM
333 REM....."REFORMAT"
334 REM
335 REM....."DELETE"
336 REM
337 REM....."END EDIT"
338 REM
339 REM....."REFORMAT"
340 REM
341 REM....."DELETE"
342 REM
343 REM....."END EDIT"
344 REM
345 REM....."REFORMAT"
346 REM
347 REM....."DELETE"
348 REM
349 REM....."END EDIT"
350 REM
351 REM....."REFORMAT"
352 REM
353 REM....."DELETE"
354 REM
355 REM....."END EDIT"
356 REM
357 REM....."REFORMAT"
358 REM
359 REM....."DELETE"
360 REM
361 REM....."END EDIT"
362 REM
363 REM....."REFORMAT"
364 REM
365 REM....."DELETE"
366 REM
367 REM....."END EDIT"
368 REM
369 REM....."REFORMAT"
370 REM
371 REM....."DELETE"
372 REM
373 REM....."END EDIT"
374 REM
375 REM....."REFORMAT"
376 REM
377 REM....."DELETE"
378 REM
379 REM....."END EDIT"
380 REM
381 REM....."REFORMAT"
382 REM
383 REM....."DELETE"
384 REM
385 REM....."END EDIT"
386 REM
387 REM....."REFORMAT"
388 REM
389 REM....."DELETE"
390 REM
391 REM....."END EDIT"
392 REM
393 REM....."REFORMAT"
394 REM
395 REM....."DELETE"
396 REM
397 REM....."END EDIT"
398 REM
399 REM....."REFORMAT"
400 REM
401 REM....."DELETE"
402 REM
403 REM....."END EDIT"
404 REM
405 REM....."REFORMAT"
406 REM
407 REM....."DELETE"
408 REM
409 REM....."END EDIT"
410 REM
411 REM....."REFORMAT"
412 REM
413 REM....."DELETE"
414 REM
415 REM....."END EDIT"
416 REM
417 REM....."REFORMAT"
418 REM
419 REM....."DELETE"
420 REM
421 REM....."END EDIT"
422 REM
423 REM....."REFORMAT"
424 REM
425 REM....."DELETE"
426 REM
427 REM....."END EDIT"
428 REM
429 REM....."REFORMAT"
430 REM
431 REM....."DELETE"
432 REM
433 REM....."END EDIT"
434 REM
435 REM....."REFORMAT"
436 REM
437 REM....."DELETE"
438 REM
439 REM....."END EDIT"
440 REM
441 REM....."REFORMAT"
442 REM
443 REM....."DELETE"
444 REM
445 REM....."END EDIT"
446 REM
447 REM....."REFORMAT"
448 REM
449 REM....."DELETE"
450 REM
451 REM....."END EDIT"
452 REM
453 REM....."REFORMAT"
454 REM
455 REM....."DELETE"
456 REM
457 REM....."END EDIT"
458 REM
459 REM....."REFORMAT"
460 REM
461 REM....."DELETE"
462 REM
463 REM....."END EDIT"
464 REM
465 REM....."REFORMAT"
466 REM
467 REM....."DELETE"
468 REM
469 REM....."END EDIT"
470 REM
471 REM....."REFORMAT"
472 REM
473 REM....."DELETE"
474 REM
475 REM....."END EDIT"
476 REM
477 REM....."REFORMAT"
478 REM
479 REM....."DELETE"
480 REM
481 REM....."END EDIT"
482 REM
483 REM....."REFORMAT"
484 REM
485 REM....."DELETE"
486 REM
487 REM....."END EDIT"
488 REM
489 REM....."REFORMAT"
490 REM
491 REM....."DELETE"
492 REM
493 REM....."END EDIT"
494 REM
495 REM....."REFORMAT"
496 REM
497 REM....."DELETE"
498 REM
499 REM....."END EDIT"
500 REM
501 REM....."REFORMAT"
502 REM
503 REM....."DELETE"
504 REM
505 REM....."END EDIT"
506 REM
507 REM....."REFORMAT"
508 REM
509 REM....."DELETE"
510 REM
511 REM....."END EDIT"
512 REM
513 REM....."REFORMAT"
514 REM
515 REM....."DELETE"
516 REM
517 REM....."END EDIT"
518 REM
519 REM....."REFORMAT"
520 REM
521 REM....."DELETE"
522 REM
523 REM....."END EDIT"
524 REM
525 REM....."REFORMAT"
526 REM
527 REM....."DELETE"
528 REM
529 REM....."END EDIT"
530 REM
531 REM....."REFORMAT"
532 REM
533 REM....."DELETE"
534 REM
535 REM....."END EDIT"
536 REM
537 REM....."REFORMAT"
538 REM
539 REM....."DELETE"
540 REM
541 REM....."END EDIT"
542 REM
543 REM....."REFORMAT"
544 REM
545 REM....."DELETE"
546 REM
547 REM....."END EDIT"
548 REM
549 REM....."REFORMAT"
550 REM
551 REM....."DELETE"
552 REM
553 REM....."END EDIT"
554 REM
555 REM....."REFORMAT"
556 REM
557 REM....."DELETE"
558 REM
559 REM....."END EDIT"
560 REM
561 REM....."REFORMAT"
562 REM
563 REM....."DELETE"
564 REM
565 REM....."END EDIT"
566 REM
567 REM....."REFORMAT"
568 REM
569 REM....."DELETE"
570 REM
571 REM....."END EDIT"
572 REM
573 REM....."REFORMAT"
574 REM
575 REM....."DELETE"
576 REM
577 REM....."END EDIT"
578 REM
579 REM....."REFORMAT"
580 REM
581 REM....."DELETE"
582 REM
583 REM....."END EDIT"
584 REM
585 REM....."REFORMAT"
586 REM
587 REM....."DELETE"
588 REM
589 REM....."END EDIT"
590 REM
591 REM....."REFORMAT"
592 REM
593 REM....."DELETE"
594 REM
595 REM....."END EDIT"
596 REM
597 REM....."REFORMAT"
598 REM
599 REM....."DELETE"
600 REM
601 REM....."END EDIT"
602 REM
603 REM....."REFORMAT"
604 REM
605 REM....."DELETE"
606 REM
607 REM....."END EDIT"
608 REM
609 REM....."REFORMAT"
610 REM
611 REM....."DELETE"
612 REM
613 REM....."END EDIT"
614 REM
615 REM....."REFORMAT"
616 REM
617 REM....."DELETE"
618 REM
619 REM....."END EDIT"
620 REM
621 REM....."REFORMAT"
622 REM
623 REM....."DELETE"
624 REM
625 REM....."END EDIT"
626 REM
627 REM....."REFORMAT"
628 REM
629 REM....."DELETE"
630 REM
631 REM....."END EDIT"
632 REM
633 REM....."REFORMAT"
634 REM
635 REM....."DELETE"
636 REM
637 REM....."END EDIT"
638 REM
639 REM....."REFORMAT"
640 REM
641 REM....."DELETE"
642 REM
643 REM....."END EDIT"
644 REM
645 REM....."REFORMAT"
646 REM
647 REM....."DELETE"
648 REM
649 REM....."END EDIT"
650 REM
651 REM....."REFORMAT"
652 REM
653 REM....."DELETE"
654 REM
655 REM....."END EDIT"
656 REM
657 REM....."REFORMAT"
658 REM
659 REM....."DELETE"
660 REM
661 REM....."END EDIT"
662 REM
663 REM....."REFORMAT"
664 REM
665 REM....."DELETE"
666 REM
667 REM....."END EDIT"
668 REM
669 REM....."REFORMAT"
670 REM
671 REM....."DELETE"
672 REM
673 REM....."END EDIT"
674 REM
675 REM....."REFORMAT"
676 REM
677 REM....."DELETE"
678 REM
679 REM....."END EDIT"
680 REM
681 REM....."REFORMAT"
682 REM
683 REM....."DELETE"
684 REM
685 REM....."END EDIT"
686 REM
687 REM....."REFORMAT"
688 REM
689 REM....."DELETE"
690 REM
691 REM....."END EDIT"
692 REM
693 REM....."REFORMAT"
694 REM
695 REM....."DELETE"
696 REM
697 REM....."END EDIT"
698 REM
699 REM....."REFORMAT"
700 REM
701 REM....."DELETE"
702 REM
703 REM....."END EDIT"
704 REM
705 REM....."REFORMAT"
706 REM
707 REM....."DELETE"
708 REM
709 REM....."END EDIT"
710 REM
711 REM....."REFORMAT"
712 REM
713 REM....."DELETE"
714 REM
715 REM....."END EDIT"
716 REM
717 REM....."REFORMAT"
718 REM
719 REM....."DELETE"
720 REM
721 REM....."END EDIT"
722 REM
723 REM....."REFORMAT"
724 REM
725 REM....."DELETE"
726 REM
727 REM....."END EDIT"
728 REM
729 REM....."REFORMAT"
730 REM
731 REM....."DELETE"
732 REM
733 REM....."END EDIT"
734 REM
735 REM....."REFORMAT"
736 REM
737 REM....."DELETE"
738 REM
739 REM....."END EDIT"
740 REM
741 REM....."REFORMAT"
742 REM
743 REM....."DELETE"
744 REM
745 REM....."END EDIT"
746 REM
747 REM....."REFORMAT"
748 REM
749 REM....."DELETE"
750 REM
751 REM....."END EDIT"
752 REM
753 REM....."REFORMAT"
754 REM
755 REM....."DELETE"
756 REM
757 REM....."END EDIT"
758 REM
759 REM....."REFORMAT"
760 REM
761 REM....."DELETE"
762 REM
763 REM....."END EDIT"
764 REM
765 REM....."REFORMAT"
766 REM
767 REM....."DELETE"
768 REM
769 REM....."END EDIT"
770 REM
771 REM....."REFORMAT"
772 REM
773 REM....."DELETE"
774 REM
775 REM....."END EDIT"
776 REM
777 REM....."REFORMAT"
778 REM
779 REM....."DELETE"
780 REM
781 REM....."END EDIT"
782 REM
783 REM....."REFORMAT"
784 REM
785 REM....."DELETE"
786 REM
787 REM....."END EDIT"
788 REM
789 REM....."REFORMAT"
790 REM
791 REM....."DELETE"
792 REM
793 REM....."END EDIT"
794 REM
795 REM....."REFORMAT"
796 REM
797 REM....."DELETE"
798 REM
799 REM....."END EDIT"
800 REM
801 REM....."REFORMAT"
802 REM
803 REM....."DELETE"
804 REM
805 REM....."END EDIT"
806 REM
807 REM....."REFORMAT"
808 REM
809 REM....."DELETE"
810 REM
811 REM....."END EDIT"
812 REM
813 REM....."REFORMAT"
814 REM
815 REM....."DELETE"
816 REM
817 REM....."END EDIT"
818 REM
819 REM....."REFORMAT"
820 REM
821 REM....."DELETE"
822 REM
823 REM....."END EDIT"
824 REM
825 REM....."REFORMAT"
826 REM
827 REM....."DELETE"
828 REM
829 REM....."END EDIT"
830 REM
831 REM....."REFORMAT"
832 REM
833 REM....."DELETE"
834 REM
835 REM....."END EDIT"
836 REM
837 REM....."REFORMAT"
838 REM
839 REM....."DELETE"
840 REM
841 REM....."END EDIT"
842 REM
843 REM....."REFORMAT"
844 REM
845 REM....."DELETE"
846 REM
847 REM....."END EDIT"
848 REM
849 REM....."REFORMAT"
850 REM
851 REM....."DELETE"
852 REM
853 REM....."END EDIT"
854 REM
855 REM....."REFORMAT"
856 REM
857 REM....."DELETE"
858 REM
859 REM....."END EDIT"
860 REM
861 REM....."REFORMAT"
862 REM
863 REM....."DELETE"
864 REM
865 REM....."END EDIT"
866 REM
867 REM....."REFORMAT"
868 REM
869 REM....."DELETE"
870 REM
871 REM....."END EDIT"
872 REM
873 REM....."REFORMAT"
874 REM
875 REM....."DELETE"
876 REM
877 REM....."END EDIT"
878 REM
879 REM....."REFORMAT"
880 REM
881 REM....."DELETE"
882 REM
883 REM....."END EDIT"
884 REM
885 REM....."REFORMAT"
886 REM
887 REM....."DELETE"
888 REM
889 REM....."END EDIT"
890 REM
891 REM....."REFORMAT"
892 REM
893 REM....."DELETE"
894 REM
895 REM....."END EDIT"
896 REM
897 REM....."REFORMAT"
898 REM
899 REM....."DELETE"
900 REM
901 REM....."END EDIT"
902 REM
903 REM....."REFORMAT"
904 REM
905 REM....."DELETE"
906 REM
907 REM....."END EDIT"
908 REM
909 REM....."REFORMAT"
910 REM
911 REM....."DELETE"
912 REM
913 REM....."END EDIT"
914 REM
915 REM....."REFORMAT"
916 REM
917 REM....."DELETE"
918 REM
919 REM....."END EDIT"
920 REM
921 REM....."REFORMAT"
922 REM
923 REM....."DELETE"
924 REM
925 REM....."END EDIT"
926 REM
927 REM....."REFORMAT"
928 REM
929 REM....."DELETE"
930 REM
931 REM....."END EDIT"
932 REM
933 REM....."REFORMAT"
934 REM
935 REM....."DELETE"
936 REM
937 REM....."END EDIT"
938 REM
939 REM....."REFORMAT"
940 REM
941 REM....."DELETE"
942 REM
943 REM....."END EDIT"
944 REM
945 REM....."REFORMAT"
946 REM
947 REM....."DELETE"
948 REM
949 REM....."END EDIT"
950 REM
951 REM....."REFORMAT"
952 REM
953 REM....."DELETE"
954 REM
955 REM....."END EDIT"
956 REM
957 REM....."REFORMAT"
958 REM
959 REM....."DELETE"
960 REM
961 REM....."END EDIT"
962 REM
963 REM....."REFORMAT"
964 REM
965 REM....."DELETE"
966 REM
967 REM....."END EDIT"
968 REM
969 REM....."REFORMAT"
970 REM
971 REM....."DELETE"
972 REM
973 REM....."END EDIT"
974 REM
975 REM....."REFORMAT"
976 REM
977 REM....."DELETE"
978 REM
979 REM....."END EDIT"
980 REM
981 REM....."REFORMAT"
982 REM
983 REM....."DELETE"
984 REM
985 REM....."END EDIT"
986 REM
987 REM....."REFORMAT"
988 REM
989 REM....."DELETE"
990 REM
991 REM....."END EDIT"
992 REM
993 REM....."REFORMAT"
994 REM
995 REM....."DELETE"
996 REM
997 REM....."END EDIT"
998 REM
999 REM....."REFORMAT"
1000 REM
1001 REM....."DELETE"
1002 REM
1003 REM....."END EDIT"
1004 REM
1005 REM....."REFORMAT"
1006 REM
1007 REM....."DELETE"
1008 REM
1009 REM....."END EDIT"
1010 REM
1011 REM....."REFORMAT"
1012 REM
1013 REM....."DELETE"
1014 REM
1015 REM....."END EDIT"
1016 REM
1017 REM....."REFORMAT"
1018 REM
1019 REM....."DELETE"
1020 REM
1021 REM....."END EDIT"
1022 REM
1023 REM....."REFORMAT"
1024 REM
1025 REM....."DELETE"
1026 REM
1027 REM....."END EDIT"
1028 REM
1029 REM....."REFORMAT"
1030 REM
1031 REM....."DELETE"
1032 REM
1033 REM....."END EDIT"
1034 REM
1035 REM....."REFORMAT"
1036 REM
1037 REM....."DELETE"
1038 REM
1039 REM....."END EDIT"
1040 REM
1041 REM....."REFORMAT"
1042 REM
1043 REM....."DELETE"
1044 REM
1045 REM....."END EDIT"
1046 REM
1047 REM....."REFORMAT"
1048 REM
1049 REM....."DELETE"
1050 REM
1051 REM....."END EDIT"
1052 REM
1053 REM....."REFORMAT"
1054 REM
1055 REM....."DELETE"
1056 REM
1057 REM....."END EDIT"
1058 REM
1059 REM....."REFORMAT"
1060 REM
1061 REM....."DELETE"
1062 REM
1063 REM....."END EDIT"
1064 REM
1065 REM....."REFORMAT"
1066 REM
1067 REM....."DELETE"
1068 REM
1069 REM....."END EDIT"
1070 REM
1071 REM....."REFORMAT"
1072 REM
1073 REM....."DELETE"
1074 REM
1075 REM....."END EDIT"
1076 REM
1077 REM....."REFORMAT"
1078 REM
1079 REM....."DELETE"
1080 REM
1081 REM....."END EDIT"
1082 REM
1083 REM....."REFORMAT"
1084 REM
1085 REM....."DELETE"
1086 REM
1087 REM....."END EDIT"
1088 REM
1089 REM....."REFORMAT"
1090 REM
1091 REM....."DELETE"
1092 REM
1093 REM....."END EDIT"
1094 REM
1095 REM....."REFORMAT"
1096 REM
1097 REM....."DELETE"
1098 REM
1099 REM....."END EDIT"
1100 REM
1101 REM....."REFORMAT"
1102 REM
1103 REM....."DELETE"
1104 REM
1105 REM....."END EDIT"
1106 REM
1107 REM....."REFORMAT"
1108 REM
1109 REM....."DELETE"
1110 REM
1111 REM....."END EDIT"
1112 REM
1113 REM....."REFORMAT"
1114 REM
1115 REM....."DELETE"
1116 REM
1117 REM....."END EDIT"
1118 REM
1119 REM....."REFORMAT"
1120 REM
1121 REM....."DELETE"
1122 REM
1123 REM....."END EDIT"
1124 REM
1125 REM....."REFORMAT"
1126 REM
1127 REM....."DELETE"
1128 REM
1129 REM....."END EDIT"
1130 REM
1131 REM....."REFORMAT"
1132 REM
1133 REM....."DELETE"
1134 REM
1135 REM....."END EDIT"
1136 REM
1137 REM....."REFORMAT"
1138 REM
1139 REM....."DELETE"
1140 REM
1141 REM....."END EDIT"
1142 REM
1143 REM....."REFORMAT"
1144 REM
1145 REM....."DELETE"
1146 REM
1147 REM....."END EDIT"
1148 REM
1149 REM....."REFORMAT"
1150 REM
1151 REM....."DELETE"
1152 REM
1153 REM....."END EDIT"
1154 REM
1155 REM....."REFORMAT"
1156 REM
1157 REM....."DELETE"
1158 REM
1159 REM....."END EDIT"
1160 REM
1161 REM....."REFORMAT"
1162 REM
1163 REM....."DELETE"
1164 REM
1165 REM....."END EDIT"
1166 REM
1167 REM....."REFORMAT"
1168 REM
1169 REM....."DELETE"
1170 REM
1171 REM....."END EDIT"
1172 REM
1173 REM....."REFORMAT"
1174 REM
1175 REM....."DELETE"
1176 REM
1177 REM....."END EDIT"
1178 REM
1179 REM....."REFORMAT"
1180 REM
1181 REM....."DELETE"
1182 REM
1183 REM....."END EDIT"
1184 REM
1185 REM....."REFORMAT"
1186 REM
1187 REM....."DELETE"
1188 REM
1189 REM....."END EDIT"
1190 REM
1191 REM....."REFORMAT"
1192 REM
1193 REM....."DELETE"
1194 REM
1195 REM....."END EDIT"
1196 REM
1197 REM....."REFORMAT"
1198 REM
1199 REM....."DELETE"
1200 REM
1201 REM....."END EDIT"
1202 REM
1203 REM....."REFORMAT"
1204 REM
1205 REM....."DELETE"
1206 REM
1207 REM....."END EDIT"
1208 REM
1209 REM....."REFORMAT"
1210 REM
1211 REM....."DELETE"
1212 REM
1213 REM....."END EDIT"
1214 REM
1215 REM....."REFORMAT"
1216 REM
1217 REM....."DELETE"
1218 REM
1219 REM....."END EDIT"
1220 REM
1221 REM....."REFORMAT"
1222 REM
1223 REM....."DELETE"
1224 REM
1225 REM....."END EDIT"
1226 REM
1227 REM....."REFORMAT"
1228 REM
1229 REM....."DELETE"
1230 REM
1231 REM....."END EDIT"
1232 REM
1233 REM....."REFORMAT"
1234 REM
1235 REM....."DELETE"
1236 REM
1237 REM....."END EDIT"
1238 REM
1239 REM....."REFORMAT"
1240 REM
1241 REM....."DELETE"
1242 REM
1243 REM....."END EDIT"
1244 REM
1245 REM....."REFORMAT"
1246 REM
1247 REM....."DELETE"
1248 REM
1249 REM....."END EDIT"
1250 REM
1251 REM....."REFORMAT"
1252 REM
1253 REM....."DELETE"
1254 REM
1255 REM....."END EDIT"
1256 REM
1257 REM....."REFORMAT"
1258 REM
1259 REM....."DELETE"
1260 REM
1261 REM....."END EDIT"
1262 REM
1263 REM....."REFORMAT"
1264 REM
1265 REM....."DELETE"
1266 REM
1267 REM....."END EDIT"
1268 REM
1269 REM....."REFORMAT"
1270 REM
1271 REM....."DELETE"
1272 REM
1273 REM....."END EDIT"
1274 REM
1275 REM....."REFORMAT"
1276 REM
1277 REM....."DELETE"
1278 REM
1279 REM....."END EDIT"
1280 REM
1281 REM....."REFORMAT"
1282 REM
1283 REM....."DELETE"
1284 REM
1285 REM....."END EDIT"
1286 REM
1287 REM....."REFORMAT"
1288 REM
1289 REM....."DELETE"
1290 REM
1291 REM....."END EDIT"
1292 REM
1293 REM....."REFORMAT"
1294 REM
1295 REM....."DELETE"
1296 REM
1297 REM....."END EDIT"
1298 REM
1299 REM....."REFORMAT"
1300 REM
1301 REM....."DELETE"
1302 REM
1303 REM....."END EDIT"
1304 REM
1305 REM....."REFORMAT"
1306 REM
1307 REM....."DELETE"
1308 REM
1309 REM....."END EDIT"
1310 REM
1311 REM....."REFORMAT"
1312 REM
1313 REM....."DELETE"
1314 REM
1315 REM....."END EDIT"
1316 REM
1317 REM....."REFORMAT"
1318 REM
1319 REM....."DELETE"
1320 REM
1321 REM....."END EDIT"
1322 REM
1323 REM....."REFORMAT"
1324 REM
1325 REM....."DELETE"
1326 REM
1327 REM....."END EDIT"
1328 REM
1329 REM....."REFORMAT"
1330 REM
1331 REM....."DELETE"
1332 REM
1333 REM....."END EDIT"
1334 REM
1335 REM....."REFORMAT"
1336 REM
1337 REM....."DELETE"
1338 REM
1339 REM....."END EDIT"
1340 REM
1341 REM....."REFORMAT"
1342 REM
1343 REM....."DELETE"
1344 REM
1345 REM....."END EDIT"
1346 REM
1347 REM....."REFORMAT"
1348 REM
1349 REM....."DELETE"
1350 REM
1351 REM....."END EDIT"
1352 REM
1353 REM....."REFORMAT"
1354 REM
1355 REM....."DELETE"
1356 REM
1357 REM....."END EDIT"
1358 REM
1359 REM....."REFORMAT"
1360 REM
1361 REM....."DELETE"
1362 REM
1363 REM....."END EDIT"
1364 REM
1365 REM....."REFORMAT"
1366 REM
1367 REM....."DELETE"
1368 REM
1369 REM....."END EDIT"
1370 REM
1371 REM....."REFORMAT"
1372 REM
1373 REM....."DELETE"
1374 REM
1375 REM....."END EDIT"
1376 REM
1377 REM....."REFORMAT"
1378 REM
1379 REM....."DELETE"
1380 REM
1381 REM....."END EDIT"
1382 REM
1383 REM....."REFORMAT"
1384 REM
1385 REM....."DELETE"
1386 REM
1387 REM....."END EDIT"
1388 REM
1389 REM....."REFORMAT"
1390 REM
1391 REM....."DELETE"
1392 REM
1393 REM....."END EDIT"
1394 REM
1395 REM....."REFORMAT"
1396 REM
1397 REM....."DELETE"
1398 REM
1399 REM....."END EDIT"
1400 REM
1401 REM....."REFORMAT"
1402 REM
1403 REM....."DELETE"
1404 REM
1405 REM....."END EDIT"
1406 REM
1407 REM....."REFORMAT"
1408 REM
1409 REM....."DELETE"
1410 REM
1411 REM....."END EDIT"
1412 REM
1413 REM....."REFORMAT"
1414 REM
1415 REM....."DELETE"
1416 REM
1417 REM....."END EDIT"
1418 REM
1419 REM....."REFORMAT"
1420 REM
1421 REM....."DELETE"
1422 REM
1423 REM....."END EDIT"
1424 REM
1425 REM....."REFORMAT"
1426 REM
1427 REM....."DELETE"
1428 REM
1429 REM....."END EDIT"
1430 REM
1431 REM....."REFORMAT"
1432 REM
1433 REM....."DELETE"
1434 REM
1435 REM....."END EDIT"
1436 REM
1437 REM....."REFORMAT"
1438 REM
1439 REM....."DELETE"
1440 REM
1441 REM....."END EDIT"
1442 REM
1443 REM....."REFORMAT"
1444 REM
1445 REM....."DELETE"
1446 REM
1447 REM....."END EDIT"
1448 REM
1449 REM....."REFORMAT"
1450 REM
1451 REM....."DELETE"
1452 REM
1453 REM....."END EDIT"
1454 REM
1455 REM....."REFORMAT"
1456 REM
1457 REM....."DELETE"
1458 REM
1459 REM....."END EDIT"
1460 REM
1461 REM....."REFORMAT"
1462 REM
1463 REM....."DELETE"
1464 REM
1465 REM....."END EDIT"
1466 REM
1467 REM....."REFORMAT"
1468 REM
1469 REM....."DELETE"
1470 REM
1471 REM....."END EDIT"
1472 REM
1473 REM....."REFORMAT"
1474 REM
1475 REM....."DELETE"
1476 REM
1477 REM....."END EDIT"
1478 REM
1479 REM....."REFORMAT"
1480 REM
1481 REM....."DELETE"
1482 REM
1483 REM....."END EDIT"
1484 REM
1485 REM....."REFORMAT"
1486 REM
1487 REM....."DELETE"
1488 REM
1489 REM....."END EDIT"
1490 REM
1491 REM....."REFORMAT"
1492 REM
1493 REM....."DELETE"
1494 REM
1495 REM....."END EDIT"
1496 REM
1497 REM....."REFORMAT"
1498 REM
1499 REM....."DELETE"
1500 REM
1501 REM....."END EDIT"
1502 REM
1503 REM....."REFORMAT"
1504 REM
1505 REM
```

HISOFT PASCAL DEVPAC

Quality ZX SPECTRUM Software HISOFT PASCAL 4T

"... I haven't seen any other compiler that could match Hisoft's Pascal" ... Using the Spectrum Micro - Autumn 1983

"This is a very impressive product ... of benefit to any Spectrum programmer" ... David Bolton ZX COMPUTING Aug/Sept 1983

Just two comments from full length reviews of our powerful and virtually full implementation of Standard Pascal. The advantages of using Pascal are well-known - fast, self-documenting, and above all, structured programs and now, with Hisoft Pascal, you can reap all these benefits on a wide range of home computers, including the 48K Sinclair Spectrum! Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!

Hisoft Pascal supports FOR...DO, WHILE...DO, REPEAT...UNTIL, CASE...OF, INTEGERS, REALS, CHARACTERS, RECORDS, POINTERS, SETS, ARRAYS etc. etc. - it is not a Tiny Pascal but a virtually full implementation of the language allowing the user to develop true high-level language skills while attaining a execution speed close to that of machine code. Complete with a 70-page manual.

HISOFT DEVPAC 3

"... DEVPAC is most highly recommended. The documentation is first class" Your Computer May 1983

"... if you write programs in machine code, buy DEVPAC - it is the best currently on the market." Adam Denning, ZX SOFT in Which Micro September 1983

Two comments from reviews of earlier versions of DEVPAC - now we have DEVPAC 3 available, a powerful Z80 assembler with conditional assembly, assembly from tape to enable generation of very large code files, ORG, EQU, DEFB, DEFS, DEFW, DEFM, labels all any length - in fact all you need for fast (3,000 lines per minute) and powerful assembly programming. But it doesn't stop there. DEVPAC 3 also includes an incredible debugger-disassembler giving you a front panel display of the Z80 system and allowing extensive debugging of your machine-code program, including single-stepping programs EVEN IN ROM!! Open up the secrets of low-level programming with DEVPAC 3.

Prices:

Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive
(NewBrain, SHARP M2700 etc) £35 plus VAT
Hisoft DEVPAC 3 (ZX SPECTRUM) £14 inclusive
(NewBrain £25 inclusive)

STOP PRESS Hisoft Pascal for the SPECTRUM now comes complete with a Tuttle Graphics package allowing fast and easy production of complex graphic displays

HISOFT

180 High Street North
Dunstable
Beds LU5 1AT
Tel: (0582) 806421



HIRE SPECTRUM SOFTWARE

CHOOSE FROM OUR VAST RANGE

FREE page CATALOGUE with full details of our range of over 280 different programs for the ZX SPECTRUM. All hired with the consent of the publishers. Whether you prefer to ZAP aliens, get lost in an ADVENTURE game, EDUCATE your children, CALCULATE the family finances or COMPILE machine code programs WE HAVE THE RIGHT TAPES FOR YOU TO HIRE.

FAST SERVICE

We stock up to 60 manufacturers' original copies of each tape (over 3000 tapes in stock), and can normally despatch your tapes the day we receive your order, and we always use first class post.

LOWEST PRICES

We believe our prices are the lowest of any library, yet we offer the LARGEST range of titles. Hire up to 3 tapes at a time, for 2 weeks, for only £1.07 each (inc. VAT & p&g).

FREE TAPE HIRE

For a limited period, we will send your first tape (your choice) FREE, so join our library now. You can't afford NOT to! If you've tried another library and are wary of our claims send a stamp and we'll gladly send you a copy of our catalogue - we're confident you'll join when you see it!



NATIONAL SOFTWARE LIBRARY

200 Mulgrave Road,
Chesham, Surrey SM2 6JT

I enclose cheque for £6.00 for LIFE MEMBERSHIP and I understand that my first tape hire will be FREE. If, within 28 days, I'm not delighted with your service you'll refund my membership fee.

Name _____

Address _____

PCW 18

Walters

COMPUTERS

Walters Computer Systems Ltd. Home and Business Computer Specialists require:

A young enthusiastic retail sales staff who are interested in a career in computing with a fast moving and go ahead company to work in a new store within Barkers of Kensington, 63-67 Kensington High Street W8. As a minimum you would need Maths and English, but people with a proven background in computers will be considered.

Please apply in the first instance to:

The Personnel Manager
Barkers of Kensington

63-67 Kensington High Street W8.



Walters Computer Systems Limited,
12 Hagley Road,
Stourbridge,
West Midlands DY8 1PS.

SPECTRUM OWNERS A.T.V. MONITOR FOR THE PRICE OF A GAME? WITH THE NEW MICRODELERIUM MONITOR INTERFACE YES!!!

Simply connect monitor interface to video in socket of your video recorder, connect video recorder to T.V.

YOU NOW HAVE A COMPOSITE VIDEO MONITOR

Flicker free display.
No Ghosting or Drift.

Will also enable you to record programs, games etc. to videotape for later analysis or demonstration. Study your game playing technique.

PRICE ONLY £14.95 inc. VAT, postage etc.

Microdrive compatible. Has its own expansion slot. Supports all

peripherals. Runs all software.

Requires BNC socket as video in socket on recorder. See Below.



CHEQUES, POSTAL ORDERS PAYABLE TO:



MICRODELERIUM LTD.

2 ABBEY CLOSE, CIPPENHAM, NR. SLOUGH, BERKS. SL1 5HZ.

ACCESS/BARCLAYCARD ORDERS BEING TAKEN NOW on BURNHAM (08286) 63571, 24hr. SERVICE.

DEALER ENQUIRIES WELCOME

P.S. DO YOU WANT FAME, SUCCESS AND RICHES?
SO DO WE!!

SEND US A COPY OF YOUR PROGRAM FOR APPRAISAL AND LET'S SEE WHAT WE CAN DO TOGETHER.

Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Spectra

on BBC

Welcome to Spectra. This program draws a planet and then with animated graphics

rotates it about its axis. The program makes use of BBC colour/sound and hi-res graphic routines.

Program Notes

10 — 50 Rem statements (can be left out)
60 — Computer goes into Graphic Mode 2

70 — 130 Sets up arrays to store Sine & Cosine routines
180 — 240 Assigns Proc statements
250 — 310 Procedure for plotting stars
330 — 410 Procedure for drawing the Planet
430 — 580 Draws the lines of Longitude (North South)
590 — 690 Procedure for drawing the ring round the planet
710 — 780 Special procedure for the animated rotation
800 — 810 Two lines to aid the rotation progress

```

10 REM *****
20 REM *** SPECTRA ***
30 REM *** N.Etheridge ***
40 REM *** (c) 1984 ***
50 REM *****
60 MODE2
70 DIM S(90),C(90)
80 SX=-1
90 RX=400
100 FOR A=0 TO RAD 360 STEP RAD 4
110 SX=SX+1
120 S(SX)=SIN(A):C(SX)=COS(A)
130 NEXT
140 VDU23:6202:0:0:0
150 VDU19:0:4:0
160 VDU19:4:7:0
170 VDU19:7:0:0
180 PROCSTARS
190 PROCPLANET
200 PROCLONGITUDE
210 PROCSTURN
220 REPEAT
230 PROCSPECTRA
240 UNTIL FALSE
250
260 DEF PROCSTARS
270 FOR STX=0 TO 700
280 GCOL0,RND(15)
290 PLOT69,RND(1280),RND(1023)
300 NEXT
310 ENDPROC
320
330 DEF PROCPLANET
340 VDU23:642:512
350 GCOL0,2
360 MOVE2,0
370 FOR SCX=0 TO 90 STEP 2
380 MOVE0,3
390 PLOT83,(S(SCX)*RX,C(SCX)*RX)
400 NEXT
410 ENDPROC
420
430 DEF PROCLONGITUDE
440 CX=5
450 FOR LX=0 TO 45
460 CX=CX+1
470 IF CX=16 THEN CX=7
480 GCOL0,CX
490 FOR SCX=0 TO 45 STEP 3
500 X=S(SCX)*C(LX)*RX
510 Y=C(SCX)*RX
520 IF SCX THEN KX=5 ELSE KX=4
530 PLOT KX,FNX,FNY
540 NEXT
550 NEXT
560 ENDPROC
570
580 DEF PROCSTURN
590 GCOL0,4
600 FOR RX=500 TO 570 STEP 8
610 FOR RX=36 TO 99 STEP 3
620 SCX=RX/100
630 IF RX=36 THEN KX=4 ELSE KX=5
640 X=S(SCX)*RX
650 Y=C(SCX)*RX
660 PLOT KX,FNX,FNY
670 NEXT
680 NEXT
690 ENDPROC
700
710 DEF PROCSPECTRA
720 FOR CX=7 TO 15
730 SOUND1,-15,5,1: SOUND1,-15,10,1
740 VDU19,CX,7:0
750 WAIT=1+RND(10)
760 VDU19,CX,2:0
770 NEXT
780 ENDPROC
790
800 DEFFNX=(2.9*Y)+(-0.4*Y)
810 DEFFNY=(0.4*Y)+(2.9*Y)

```

Spectra
by N Etheridge

Psychiatrist

on Spectrum

This program simulates human intelligence by giving reasonable replies to questions and phrases the user types in. Shorter

inputs generally get more rewarding responses and will be analysed more quickly. Before running the program ensure Caps Lock is on as the program ignores lower case entries.

This program uses Currah Micro Speech and will give a crude spoken answer if you

have it attached. If you don't have one lines 1000 onwards can be omitted and line 167 should be removed. Change 175 Goto 10. The program works by slicing the inputted question into single words then comparing these words with set ones held in data statements.

```

1 BORDER 0: PAPER 0: INK 7: C
LS
2 INPUT "SPEECH =1 , TEXT =0
":T$
3 LET SPE=0: IF T$="1" THEN L
ET SPE=1
10 INPUT A$: LET A$=A$+" "
11 LET S=1
12 IF A$=" " THEN GO TO 10
13 IF A$(LEN A$-1)="?" THEN LE
T A$=A$( TO LEN A$-1)+" "
14 IF LEN A$<4 THEN LET A$=A$+
" "
15 LET R$="": LET D$="": LET Q
$="": LET A$="": LET S1=1: LET D
=0: LET NEG=0: LET N$=" "
20 FOR A=1 TO LEN A$: IF A$(A)
<>" " THEN NEXT A: GO TO 75
25 LET U$=A$(S1 TO A-1): LET S
1=A+(1 AND A<>LEN A$)
30 RESTORE 35: FOR B=1 TO 5: R
EAD B$,C$:
35 DATA "YOU","ME","+ME","YOU
","+I","YOU","+MY","YOUR","+YOUR
","MY"
40 LET DD=(1 AND B$(1)="+")*0:
LET B$=B$(2 TO )
45 IF U$<>B$ THEN NEXT B: GO T
O 55
46 IF U$="YOU" AND D=0 THEN LE
T C$="I"
50 LET R$=R$+C$+" ": LET D=D+D
D: NEXT A: GO TO 75
55 RESTORE 60: FOR B=1 TO 5:
EAD B$
60 DATA "NO","NOT","NEVER","DO
NT","CANT"
65 IF U$<>B$ THEN NEXT B: LET
R$=R$+U$+" ": NEXT A: GO TO 75
70 LET NEG=1: LET N$=B$+" ": N
EXT A
75 RESTORE 80: FOR B=1 TO 9: R
EAD B$
80 DATA "DOES","DO","WHY","WHA
T","WHEN","WILL","CAN","COULD","
SHOULD"
85 IF R$( TO (LEN B$ AND LEN B
$(LEN R$))=B$ THEN LET R$=R$(LEN
B$+2 TO ): LET Q=1: LET Q$=B$:
GO TO 100
90 NEXT B
95 DATA "WHY DO YOU WANT TO KN
OW"+R$,"IM NOT TELLING YOU","IM
ASKING THE QUESTIONS","CHANGE TH
E SUBJECT"
96 DATA "CARRY ON","OH I SEE",
"WHY DONT YOU "+R$,"I SEE"
100 IF N$="NEVER" THEN LET N$=
"DONT"
110 IF NEG=1 THEN GO TO 130
120 RESTORE 35: FOR B=1 TO 5: R
EAD B$,C$: LET Q$=B$(2 TO ): IF
R$( TO (LEN B$ AND LEN B$(LEN R$
))=B$ THEN LET D$=B$: LET R$=R$(
LEN B$+2 TO ): GO TO 130
125 NEXT B
130 IF N$="" THEN LET N$="DO YO
U WANT TO "
131 LET UU=0
135 IF D$<>" " AND Q$="" OR D$<>
" " AND NEG=1 THEN LET N$="DO YOU
SAY "+D$+" "
136 RESTORE 35: FOR B=1 TO 5:
EAD B$,C$: LET B$=B$(2 TO )
137 IF R$(5 TO (5+LEN B$-1 AND
5+LEN B$-1<LEN R$))=B$ THEN LET
UU=UU+1: IF UU>2 THEN LET R$=R$(
TO 5-1+LEN B$): GO TO 150
138 NEXT B: LET S=S+1: IF S<LEN
R$ THEN GO TO 136
150 LET X$="WHY "+N$+R$+" "+(U$
AND R$(LEN R$-LEN U$ TO LEN R$-
1)<>U$)
155 IF Q$="WHAT" OR Q$="WHEN" T
HEN RESTORE 95: FOR B=1 TO INT (
RND*4)+1: READ X$: NEXT B
160 IF A$=R$ THEN RESTORE 95: F
OR B=1 TO INT (RND*4)+1: READ X$
: NEXT B
164 IF LEN X$<32 THEN LET X$=X$
+" ( TO 32-LEN X$)
165 IF R$="" THEN LET X$="WHAT
ABOUT ME"
166 IF X$(32)<>" " THEN LET X$=
X$( TO 31)+" "+X$(32 TO )
167 IF S=1 THEN GO TO 1000
170 LET SC=USR 3582: PRINT AT 2
1,0;X$( TO 32)
171 IF LEN X$>32 THEN LET SC=US
R 3582: PRINT AT 21,0;X$(33 TO )
175 IF S=0 THEN GO TO 10
1000 DATA "SAY","S(22)" "A" "(22
)" "WANT" "(wh)ont" "TO" "(TT) (O
UU)" "HAVE" "hav" "(wh) (i
)" "WHO" "(wh) (ouu)" "ME" "(ee)
" "I" "(i)" "YOU" "(iouu)" "MY"
"(fi)" "YOUR" "(or)" "THAT"
"(h)a(t)" "SEE" "(ee)" "WHEN"
"(h)een" "WILL" "(wh)i(t)" "DO
NT" "(oo)n(t)" "DO" "(d)ouu)"
"CAN" "Can"
1001 LET S=1: LET Z$="": FOR I=
1 TO LEN X$-1
1002 IF X$(I)<>" " THEN NEXT I:
GO TO 1100
1003 LET W$=X$(I+1 TO (I-1 AND I-
1<LEN X$)): LET S=(I+1 AND (I+1<
LEN X$)
1004 IF LEN W$=0 THEN GO TO 1040
1005 RESTORE 1000: FOR I=1 TO 10
: READ A$,B$
1010 IF W$<>A$ THEN NEXT I: LET
Z$=Z$+" "+W$: GO TO 1040
1015 LET Z$=Z$+" "+B$
1040 NEXT I
1045 IF S=1 THEN LET S$=Z$: FC
R Y=0 TO 200: NEXT Y: GO TO 10

```

Psychiatrist
by Mark Andrews

The Box

on BBC

This program is for any BBC computer in Mode 7.

This program produces a double lined border around any number of characters.

Both the character's colour and the border colour can be set up. The demonstration shows the boxes overlapping and separates.

```

10 REM MODE7 BOX PROGRAM
20 MODE7:VDU23;11,0;0;0;0;0
30 PROCbox(0,2,149,131,"A")
40 PROCbox(5,9,145,134,"Box")
50 PROCbox(13,16,148,133,"DEMONSTRATION")
60 PROCbox(18,2,151,130,"By G. PARRIS")
70 BOTD70:END
80
90 DEFPROCbox(X%,Y%,C,C2,A#)
100 n=LEN(A#)+2:RESTORE 170
110 FORR%=0TD7
120 READ a,b,c,d,e,f,g
130 IF R%#3 OR R%#4 THEN VDU31,X%,Y%+R%,C,a,b,c,C2,32:PRINTA%:VDUd,
e,f,g:NEXT140 VDU31,X%+1,Y%+R%,C,a,b,c:PRINTSTRING$(n,CHR$d):VDUe,f,g
150 NEXT:ENDPROC
160
170 DATA 95,112,112,112,112,112,48
180 DATA 106,95,112,112,112,48,53
190 DATA 106,106,32,32,32,53,53
200 DATA 141,106,106,C,32,53,53
210 DATA 141,106,106,C,32,53,53
220 DATA 106,106,32,32,32,53,53
230 DATA 106,162,163,96,96,33,53
240 DATA 162,163,163,96,96,96,33
    
```

The Box
by G Parris

Microradio

GW6JJN



Summon the Space cavalry

This week I will continue the review of the Tandy TRS 80 Model 100 and its applications in radio.

I have mentioned before the AMT-1 communications interface from ICS Electronics in reference to the Commodore series of computers. The AMT-1 can, however, also be used with RS232C interfaces, one such being on the Model 100. It is a simple enough job to connect the Tandy to the AMT-1. It offers, apart from the usual Radio Teletype, the Amtor system which is a form

of extremely accurate radio teletype with error checking facilities.

Amtor is a British system first invented by J. P. Martinez G3PLX. Once two stations using the system are locked together synchronously, then the contact will remain almost completely 100 per cent even through difficult interference conditions. This is faster and more accurate than morse code as well as being a lot more efficient. Of course you could still use Morse Code on this system, but that would be akin to using a hammer to crack a nut.

The other mode available with the unit is direct ASCII. Several baud rates are available set by another program resident in the incredible Model 100. Called *Telecom*, this program is designed to send data and files, etc, over the phone, but of course it can be used just as well to send data over the air. Just think for a

minute about what your computer can display on the screen using the in-built ASCII codes that contain the characters available on your keyboard. Whatever you type, or have contained in memory files, can be transmitted. This column could be transmitted in a matter of seconds. Using the Model 100 and the AMT-1, very sophisticated and error free communication is possible.

The radio applications of the Model 100 are in themselves justification for getting the machine. Added to that are the facilities and in-built programs that make life so easy with the machine as well as the RS232C interface and parallel printer port.

In fact, the combined cost of the Model 100 and the AMT-1 is well below that of most shortwave radio transceivers. During the review period, I found the machine a great asset to my radio shack and, since it

made by a company whose name is Radio Shack in the United States, it somehow seemed fitting.

With the Model 100, which is no bigger than the size of this magazine, one can communicate worldwide and have the facilities of computers that only a few years ago filled whole rooms. I can remember seeing films when I was about ten years old where the hero merely spoke into his wristwatch in order to summon the space cavalry. Now we are almost at the point where we can take such things for granted. More on wristwatch radios next week.

Ray Berry GW6JJN

The author is a radio and microcomputer enthusiast. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 2LD.

Starburst on Dragon

This produces a starburst effect in a series of colours and backgrounds chosen on a random basis.

Program notes
10-20 Prepares screen
30-40 Sets Variables
50 Draws lines

```
1 KEM STAR BURST
5 REM M. TRUELOVE 1984
10 N=RND(4)
20 PMODE N: SCREEN N,N:PCLS N
30 FOR A=1 TO 255 STEP 10
40 FOR B=1 TO 255 STEP 10
50 LINE(127,90)-(A,B),PSET
60 NEXT B
70 NEXT A
80 GOTO 10
```

Starburst
by Mark Truelove

Arcade Avenue

Tip of the Iceberg

This week I continue my look at Ocean Software by looking at some of their latest releases.

Eskimo Eddie is another in the line of well produced arcade copies that made Ocean its name. In case you can't guess from the title this is a version of *Pengo* that reinforces the reputation for graphics that the company has. Of all the myriad versions of *Pengo* that have been released for the Spectrum, this one looks most like the original penguin character.

The game also plays better than the majority of the releases by other houses, although that doesn't mean it plays well. *Pengo* is one of my favourite arcade games and *Eskimo Eddie* made me painfully aware of the slowness of the Spectrum compared to dedicated machines. The penguin is slow to respond compared to the speed of the snow bees and, since there are fewer places to run on the limited screen size of the machine, it proves incredibly hard to survive.

Like *Mr Wimpy* this game opens with a bonus screen unrelated to the original arcade

format — in this case a sort of arctic frogger which involves dodging polar bears and icebergs. Unfortunately, this proves ridiculously easy if you wait at one side of the screen and time your dash carefully, and it soon becomes a merely irritating impediment to getting on with the *Pengo* game.

However, if you are looking for a pretty good version than do consider this one, especially if you have one of the many joystick options because this will make all the difference to the playability.

Pogo is Ocean's latest charming release and deservedly so. It is without doubt the best *Q-Bert* I have seen for the Spectrum (although Automata's *Pi-Balled* comes close). There is no point in explaining what it's about since I'm sure you all know, but take my word

that the graphics are excellent, the sound is good and the level of difficulty seems just right. The big departure for Ocean was that this game is in fact licensed from R&R Software. This obviously gives the advantage of Ocean's reputation and marketing clout ■ the smaller company and a similar deal

seems to have been reached by Vortex for the CBM 64 version of the excellent *Android 2*.

The Hungarian company Andromeda have written *Chinese Juggler* for Ocean, a game that deservedly has received many kudos for its originality. Based on the old magic act where a demented refugee from Pyrex spins dozens of plates on long wobbly sticks, the quality of this game is beyond question. Graphics and music are superb and if, like me, you found the original stage act mind numbingly dull to watch don't worry. Playing *Juggler* is almost like being there yourself with all the frustration and addiction. My only regret is that the plates do not smash everywhere adding to the chaos.

Recently released for the Spectrum as well as the CBM 64, it will be interesting to see if the version for the Sinclair machine is as good. The wonderful soundtrack added so much to the Commodore game.

The final game I want to look at is *Transversion*, one of Ocean's lesser known programs. This release is worthy of note for several reasons. It is a

shoot-em-up space game (rare for Ocean), it is a 16K game (very rare for Ocean) and it is an original game that is written by one of Ocean's own programmers (gasp... faint). So what's it like? Well, pretty average really. It is a graphically unambitious grid game rather reminiscent of Jeff Minter without the loud whams! and blams! It suffers from being 16K but *Ultimate* proved that that should not stop a great game being great. *Transversion* is reasonably addictive and worthy of several plays, but is really nothing special.

So there we are. I'm still waiting to get a glimpse of *Gilligans Gold* and *Cavelon*, the two latest releases. One day Ocean will come up with an original game, written by themselves, that is of the same quality as their arcade copies. It should be worth waiting for.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to: Tony Kendle, Arcade Avenue, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

TITANIC

The Adventure Begins...

With Cursah Micro Speech

FREE on Side C
a minicup in high energy rock
TITANIC (The music)



FOR 48K SPECTRUM

R&R Software Ltd, 11 Russell Street, Gloucester GL1 1NE. Tel: 0452 502819

NOW AVAILABLE
ONLY £7.95

Walters

LOOK

GAMES PROGRAMMERS

You could be earning

£20,000 +

for your game!
whatever the machine

**SO SEND THEM TO US
NOW!**

Send tape and instructions to:
Ian Smart, Software Development Manager,



Walters Computer Systems Limited
12 Hagley Road,
Stourbridge,
West Midlands DY8 4JS

SPECTRUM SOFTWARE CLUB!

LOWEST-COST!

FREE CASSETTE!

- * Hire and Exchange games from just 50p
- * Buy new games at the best possible discounts
- * Hundreds and hundreds of games to choose from
- * Regular Newsletter with details of new releases etc
- * Every new member gets a FREE BLANK CASSETTE!
- * All the benefits of other clubs at HALF THE PRICE!
- * All cassettes original & supplied with owners permission

Send just £3.95 and we will rush you your
Membership and, Free Cassette:-
SPECTRUM SOFTWARE CLUB, (pew),
287-291 High Street, Epping, Essex, CM16 4DA
(or send a stamp for catalogue)

SPECIAL OFFERS

BBC MODEL B	£379.95
ELECTRON	£189.95
SPECTRUM 16K	£94.95
SPECTRUM 48K	£124.95
SPECTRUM/CBM64 VALHALLA/HOBBIT	£11.95
SABER WULF	£8.50
PSYTRON	8.95
SPECTRUM PATIENCE 16K/48K	£5.50
SPECTRUM WONDERWORM 48K	£5.50
SPECTRUM INPUT/OUTPUT PORT KIT	£12.95
BUILT	£16.95
SPECTRUM 16K TO 48K UPGRADE (State issue 2 or 3)	£25.00

Large range of ZX81 hardware available. S.A.E. for details.

HAVEN HARDWARE,

4 Ashby Road, Ashby, Worlton, Cumbria CA14 4RR.

Tel: 0945 861 627 or 0945 65586.

ACCESS VISA ACCEPTED BY MAIL ORDER TELEPHONE

NOW
3RD
GREAT
YEAR!

HIRE

SPECTRUM
ZX81 and
COMMODORE 64
TAPES

HUGE RANGE!

**ADVENTURE
GAMES**

**ARCADE and
SIMULATION GAMES**

BUSINESS

**and PRACTICAL
PROGRAMS**

UTILITIES

M/C COMPILERS

EDUCATIONAL

**FROM OVER
60,000 TAPES**

FREE

**ILLUSTRATED
QUARTERLY
MAGAZINE WITH**

**TIPS, NEWS,
REVIEWS**

DISCOUNT OFFERS

**LIFE
MEMBERSHIP
£5.00**

**TAPE HIRE FROM
50p**

(INCLUDING VAT)

**OVER
3,000
DELICIOUS ANIMAYS!**

- The first true software library to be set up in the world—and still the largest! ■ Unrivalled tape stock, as you'd expect from our head start! ■ Run by a 16-bit computer (2 million bytes of program and data on disk!) with the help of six able but more friendly men: humans! ■ Often imitated (sometimes almost to the letter—flattery indeed!) but never equalled! ■ Friendly, helpful service at the end of a phone if needed! ■ Free membership of our Discoun Club: provides off peripherals and top-of-the-chart tapes! ■ Any loading problems (rare!) automatically credited! ■ Shop now open (next to Post Office) for rental and discount sales of tapes and peripherals! ■ Branches throughout the world! ■ No complicated schemes, no commitment to quantity—rent what and when you like! ■ Printed, illustrated magazine "Computers" packs in more than any more typed newsletter! ■ Keenest-ever sales! ■ ACCESS holders can join by telephone on 0730 892732. ■ NO RIVAL can offer all this.

SPECIAL OFFER!

**YOUR FIRST TWO
TAPES FREE**

(IF YOU USE THIS COUPON!)

or send £1 for magazine & details
PHONE ALEC FRY ARPS, FRIDAY
ERN AFRY BA

To: SOFTWARE LIBRARY, Farnham Road, West Liss, Hants GU33 8JU.

NAME.....Machine.....

ADDRESS.....

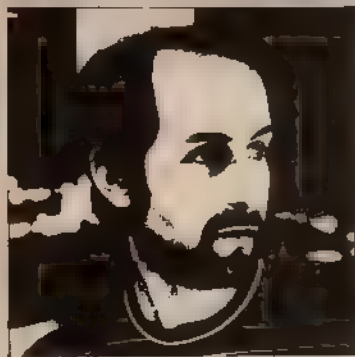
**THE
ORIGINAL
SOFTWARE
LIBRARY**

Special offer from this issue: LIFE MEMBERSHIP £5

(normally £8.50) Overseas (Europe only) £10, or per local branch in W. Germany, France, Holland, Belgium, Scandinavia, South Africa, Ireland—and Int. Rep'l Coupon and we'll forward your enquiry. All schemes supplied with owners permission. PCW/K



Tony Bridge's Adventure Corner



Lost in the forest

Now to some of your letters: Christopher Rolland, from West Sussex, writes about *Inca Curse*, Adventure ■ from Artic. "Dear Tony, I cannot get past the latched door to the Temple. I have tried everything, but nothing will work. Please help!" When confronted by a locked door, one of the things that may work in an adventure, apart from unlocking it with a key, is to *Break* the door or lock in some way. In *Inca Curse*, you should have found something in the first location (the Clearing). To find this, and to use it, try (the Corner Code. Start at the second letter and read off every other letter. At the end, return to the first letter and repeat the process.

ESAT/KRL/APTL/CEHA/IVME/OSW ■ '90/E ■ TUS
STEE/SCTK/ ■ CB-KR

"Tony Bridge — HELP!! I desperately need your advice on *Madness and Minotaur* for the Dragon 32, as I am stuck on the first floor looking for the elusive mushroom, which you need to get the first spell. Also, I can't get the lamp to light."

This is from Richard Iveson of East Yorks. Well, Richard, this is an Adventure that I haven't had the pleasure of playing myself, although some months ago there was a flurry of interest in it from readers of this column (see Vol 2 No 31, in which Brian Cadge reviewed it — he didn't like it). This might be a clue to the problem with the lamp:

IULR/FNOC/ROTH/HTEA/LIAN/MSPO

And as for the dreaded mushroom, which seems to have caused an awful lot of trouble:

RYAO/NUON/TEHE/EDMF/UQSO/HDRF/ORDO
MMFF/RIOR/MSTT/HFL/RODO

Scott Adams is a name that surely needs no introduction to readers of the Corner. Several letters have reached The Grand Elf concerning the cartridge versions of the series for the Vic-20.

"Dear Tony, How do I enter the crack in *Voodoo Castle*? ■ *Adventureland*, I can't get past the throne room. Help, please! *Pirate Cove* has me stumped trying ■ get the second treasure.

"Here are my votes for these Adventures:

Voodoo Castle 8/10: a very good Adventure, really gets the brain and imagination working — very hard, superb Scott Adams! *Adventureland* 7/10: I think I'd enjoy it more if I could get further, but whenever I feel down, a witty comment!

Pirate Cove 10/10: Brilliant! Debbie Dore (age 12) Greater Manchester.

I agree with your rating of *Pirate Cove*, Debbie, it ■ my favourite Scott Adams — at the moment! I have just started playing this one and can't help you much (maybe some kind person . . .), but as a nudge in the right direction, try reading the map! To get through the crack, you may find that the Medium will be able to help you. There ■ a mirror in the lava, but I don't have the faintest idea how you might get it. Help please!

David Poole from Crewe, is also having trouble with *Voodoo Castle*. He says that the lamp mentioned doesn't exist — but have you got the Idol, David? If you try cleaning it, you may find it has some wonderful properties that will help shed light on the darker corners of the Castle! And incidentally, yes, the Scott Adams book of Hints is available in the UK. It will cost you about a fiver, and your local Atari/

solved a few games, but is having terrible trouble with *Knight's Quest*.

"We are stuck at the narrow cleft and have tried just about everything but nothing works. If I am to encourage greater participation in the club, it is essential that problems are solved within a reasonable time span."

I have to sympathise, Mr Christie, adventures can often be very annoying. However, the environment you describe, with many people putting their heads together to wrestle with ■ problem, will eventually uncover the solution. — I always find that two heads are better than one in working through an Adventure.

By now, you will have probably found the solution to the Narrow Cleft, but for anyone else at the same place in this most intriguing program, ■ that needs to be done (as you will find that your character cannot go through the crack in person) is to send someone else. This is one of those solutions that ■ so stunningly obvious when pointed out to you that you wonder how you could have missed it! — an excellent example of the sort of problem to be found in *Knight's Quest*.

Finally, the first letter asking about an



Commodore stockist should have it. It's very useful in some cases, but will by no means give you the whole solution to any of the Adventures.

Mrs C White writes from Woking to beg for help in *The Count*. "This is our very first Adventure and quite honestly, we've got nowhere. Can you give us a few clues?"

Scott Adams Adventures are a good place to start, Mrs White, though they are not the easiest. In *The Count*, it would seem to be a good idea to go and find the Count before he comes to get you! Start by examining the Castle from the outside. If this doesn't help, you might find some objects near the bed — if you find the Crypt after all this, there'll be something there that will point you to the Count's resting place.

Turning from Scott Adams now, I received a letter from Brian Christie of Belfast some weeks ago. He runs an Adventure Club in the local youth club, which has

adventure for the Memotech MTX 512. It's from D R Brimmer of Chandler's Ford, near Southampton. He is stuck in *Alice in Wonderland*, and he cannot get the warrant without getting lost in the Forest. Can anyone help?

We've neglected *The Hobbit* Hall of Fame for ■ while, so next week I will update it with some of the many names of people who have completed the Adventure.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

CheetahSoft

Soft we're not

FOR SPECTRUM 48K



CONQUEST

CONQUEST A tactical game which even veteran players will find both challenging and rewarding.

Mediterranean Europe is divided into grid squares. Your aim, as Emperor, is to gain 100 squares of territory as quickly as possible – at the same time dealing with Barbarian counter-attacks, plagues, civil war and rival Emperors.

5 levels of skill, plus a continuous 'Conquest' game where all the difficulty levels are thrown in together.

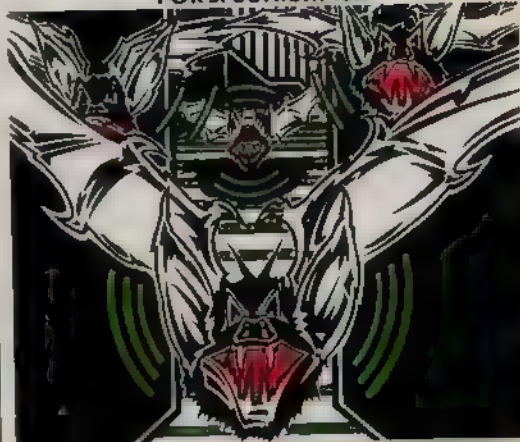
3D BAT ATTACK An all action, 3 dimensional maze game where you gather up blocks of gold, at the same time pitting your wits against vicious vampire bats whose only purpose in life is to locate, hunt and kill you.

4 levels of skill. At each level the game gets faster and more complicated, and the vampires more dangerous.

CheetahSoft

Soft we're not

FOR SPECTRUM 48K



3D BAT ATTACK

AFTER THESE, THE REST IS KIDS STUFF.

Are you ready for CheetahSoft?

There's only one way to find out.

But be warned: these vampire bats know a good meal when they see one. And our friend with the scythe has had years of experience.

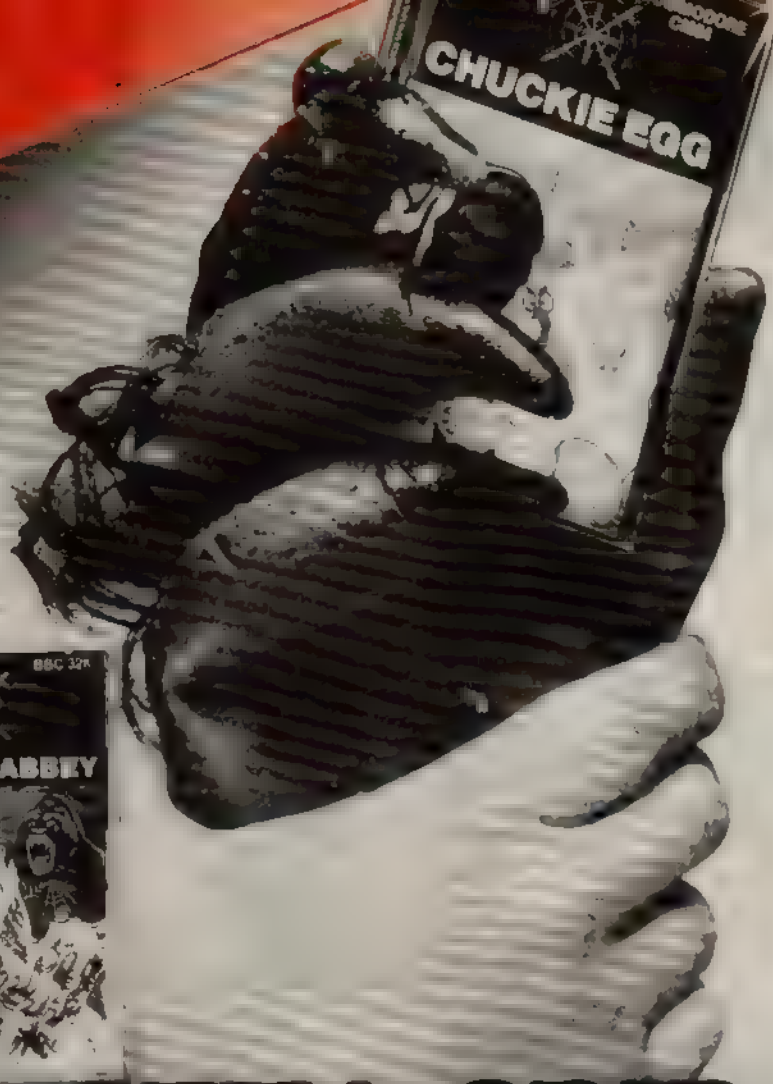
CheetahSoft

Soft we're not

So don't play unless you're ready to play the game for real. Because you'll find there's one sure thing about CheetahSoft: Soft we're not.

£6.95 at all
good stores.

ALSO AVAILABLE ■ sending cheque or postal order for £6.95 to:
CHEETAHSTFT Ltd 24 RAY ST. LONDON EC1 Tel: 01-833-4733



GET A GRIP OF A&F SOFTWARE

*Commodore C64
Chuckie Egg
BBC 32K Haunted Abbey*

AVAILABLE FROM ALL GOOD
COMPUTER SHOPS

John Menzies



Selected
Stores

	C64	BBC	ELECTRON	DRAGON	SPECTRUM
CHUCKIE EGG	£7.90	£7.90	£7.90	£7.90	£6.90
CYLOM ATTACK		£7.90	£7.90		
HAUNTED ABBEY		£6.90			
PHAROAH'S TOMBS		£7.90	£7.90		



Unit 8, Canalside Industrial Estate,
Woodbine Street East, Rochdale, Lancs.
OL16 5LB. Tel: 0706 341111

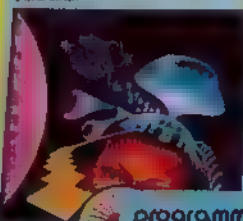
Sold subject to A&F Software Ltd.
Full terms and conditions available on request

For BBC Micro and Electron Users

functional forth for the BBC computer

Understand your computer through forth

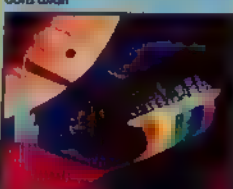
bertie allan



graphic art for the BBC computer

turtle graphics and art

bertie allan



programming for education on the BBC computer

a handbook for primary education

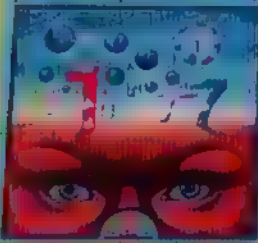
john scriver and patrick hall



programming for education on the electron computer

a handbook for primary education

patrick hall and john scriver



DIY robotics and sensors with the BBC computer

practical projects for control applications

john billingsley



making music on the BBC computer

an musician's guide to programming

ian waugh



They turn micro users into big operators.

Sunshine's great books for the BBC and Electron help you make your favourite micro into a mighty machine.

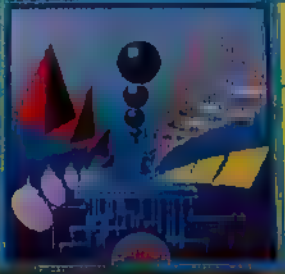
Read, and discover how to program, to create music, to draw graphics, to do maths, to produce robots and even how to give your micro artificial intelligence.

Sunshine's best-sellers are at all good bookshops now. Or order, using the coupon here. And transform you, and your micro, into something special.

graphic art for the electron computer

turtle graphics and art

bertie allan



Sunshine books Direct Order Form

Books for the BBC Micro

Functional Forth	£5.95
Graphic Art	£5.95
Programming for Education	£5.95
DIY Robotics and Sensors	£6.95
Making Music	£5.95

Electron Books

Programming for Education	£5.95
Graphic Art	£5.95
The Working Electron	£5.95

BBC Micro & Electron books

Artificial Intelligence	£6.95
Essential Maths	£5.95

Send to: Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD

Please send me the following books:

Book _____
Book _____
Book _____

☐ I enclose a cheque for £ _____ payable to Sunshine Books.

☐ I enclose a postal order for £ _____ payable to Sunshine Books.

☐ Please charge my Visa/Access card No. _____
Valid from _____ expires end _____

Signed _____

Name _____

Address _____

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and all good bookshops. Dealer enquiries: 01-437 4343

OMEGA SYSTEMS

DRAGON 32 PROGRAMS

* **HIGH SPEED DRAGON** - Why buy expensive Discdrives. Try our menu driven tape and find any of our FREE example programs in seconds! Inc. Minichess, Grandprix, Galactica, Blockbusters, etc. (Use our Menu to save or load up to 33 of your own programs. ONLY £3.95 Inc. (By Return post)

* **POPULAR COMPUTING WEEKLY REVIEW SAYS:** - Simple idea which a lot of home programmers could find useful (with instructions that actually encourage you to copy the program). It's excellent value. P.C.W. May 84.

* Price includes postage & packing.
(Add £1 P&P outside U.K.)
Cheques/P.O. Please to:-

* **OMEGA SYSTEMS**,
44 Curlew Road, Abbeyvale,
GLOUCESTER, GL4 7TF.
Tel. (0452) 500155.

* **DEALER ENQUIRIES**
WELCOME

**HIGH
SPEED
DRAGON**



38 BEATON CLOSE, BLUNSDON, WILTSHIRE, SN2 4BE.

Send to: PEEKAY SOFTWARE, DEPT PCW.

Both programs MEGA software. You need not alter any part of your programs to convert them to the new screen format. If you would like to see before you buy then send us £1 for our Screen Demo Tape. (You will be refunded when you buy one of the programs. Alternatively ask your computer shop to show you the demonstration cassette)

You'll be amazed when you see how clear the characters are!

The ultimate SCREEN CRUNCHER - just right for programmers and business users

64 x 32 screen £4.50 inc p&p

Standard screen format for home computers, as this is the world's

Perfect for connecting your Spectrum to other computers.

40 x 24 screen £4.50 inc p&p

PEEKAY SOFTWARE HAVE THE ANSWER

FED UP WITH THE SPECTRUM'S DISPLAY?

SUPAPUNTA RACING FORECASTER

FOLLOWING THE SUCCESS OF LAST YEAR'S PROGRAM, WE PRESENT THE 1984 FLAT SEASON EDITION OF THIS MOST COMPREHENSIVE SYSTEM

Data is entered from the Racing Section either a morning daily, or a specialist WEEKENDER paper. Depending on the depth of analysis required, data-entry time can vary from 8 to 30 minutes per race.

FACTORS CONSIDERED BY THE PROGRAM INCLUDE:

- * **PAST SIX-RACE FORM RECORD** (with quality of last venue considered)
- * **TRAINER/RIDER WINS AT PRESENT VENUE**
- * **DRAW & GOING ADVANTAGES, IF ANY**
- * **PAST COURSE, DISTANCE, COURSE & DISTANCE WINS**
- * **"TEN-YEAR TELL-TALE" ANALYSIS PROCEDURE**

Already included on the tape, and utilised from within the program is the top ten Trainer/Jockey records for ALL 34 principal courses

As an added, valuable bonus SUPAPUNTA has the facility to alter the significance of any or all of the above variable factors and re-compute runners' forms accordingly. This feature enables rapid development of users' own system if required.

Seasonal Updates available on a 'trade-in' basis of £3.50 + outdial

Cassette versions available for - **DRAGON 32/4, SPECTRUM 48K, ELECTRON, BBC Model B £8.00 inc. PLEASE STATE MACHINE!**

Microdrive version (Spectrum 48K only) £11.00 inc.

Audio only direct from

RED ROM DATA, 72 LAMBERT ROAD, GRIMSBY, Lincs. DN32 0NR

MEGASAVE FANTASTIC SAVINGS

BBC		COMMODORE	
FORTRESS	7.25	INFERNO	5.50
FOOTBALL MANAGER	6.50	PSYTRON	6.75
BLAGGER	6.50	MUGGY	6.30
THE HULK	6.50	DULL	10.75
SPECTRUM		CODE NAME MAT	5.20
MOON ALERT	6.90	JET SET WILLY	4.75
JACK & BEANSTALN	4.95	BEAKY	4.85
KOSMIC KANGOO	5.10	CAVELON	4.85
LORDS OF MIDNIGHT	8.50	BLUE THUNDER	4.75
COSMIC CRUISER	4.25	TRASHMAN	4.75
THE HULK	8.50	FIGHTER PILOT	6.25
ANTICS	5.75	H.U.R.G.	11.50
AD ASTRA	4.95	COSMIC CRUISER	4.25
SABRA WOLF	6.95	VIC 20	
WORLD CUP	5.95	FLIGHT PATH 737	6.30
GILLIGANS GOLD	4.75	TOWER OF EVIL	5.45
LES FLIES	5.50	COMPUTER WAR	5.45
TORNADO LOW LEVEL	4.75	SUB COMMANDER	5.45
AUTOMANIA	5.75	TANK COMMANDER	5.45

FREE POSTAGE PLEASE STATE WHICH MICRO FAST SERVICE

SEND CHEQUE P.O. to:

MEGASAVE Dept 1, Westbourne Terrace, London W2

MULTI - COLOURED SPRITE - GRAPHICS

for the 48K Spectrum

ANIMATE YOUR ALIENS



Yellow
Red
Cyan

Use this 5 Star Graphic Utility Program
And write Great Games. Full instructions included

Only £5.00 p inc p-p

also now available: HAMPTONS CAUGHT!

The Most Amazing Maze Game for the 48K Spectrum

Only £5.50 p inc p&p: send cheques/postal orders to

B. SIDES SOFTWARE, 4 Wilkeson Road, Cefn Glas,
Bridgend, South Wales. Tel (0656) 68371

SAVE... SAVE... SAVE

DISCOUNT COMPUTERS AND SOFTWARE

ATARI 800XL £145.00

48K ORICATMOS £139.95

PRICES INCLUDE VAT & P&P

DISCOUNT SOFTWARE FOR ATARI *

ORIC ATMOS * CBM 64 * VIC 20 * BBC *

ELECTRON * DRAGON

FOR FREE LIST SEND SAE STATING MACHINE

TYPE TO

COMPUTER CITY

20 THE SHOPPING HALL, LEWISHAM CENTRE

LEWISHAM, SE13 OR TELEPHONE 01-318 4382

Spectrum 48K

Historical Wargaming

AUSTERLITZ £9.50

This game is a re-creation of Napoleon's famous victory at Austerlitz. 'You are Napoleon'

The computer provides a highly sophisticated opponent with 90% of the program written in machine code

All the mechanics of wargaming, such as movement, combat, terrain effects, reports etc., are taken care of by the computer. The game is for one player only with 3 levels of difficulty and is played on a physical map of the battlefield

PACIFIC WAR £6.00

MIDWAY £5.25

Relight the aircraft carrier battles of World War 2. The player controls the American forces, you computer the Japanese. Full screen display of task forces and aircraft movement. Includes antiaircraft, submarines, lighter defence of ones own carriers and allows the player to control the detailed activities of each aircraft carrier from within its own status display

Cheques or Postal Orders to:

K.W. SOFTWARE

165 Ringlow Rd., Sheffield S11 7PB



A Simple Answer

Andrew Hollyhead of Tiffany Green, West Midlands writes:

Q I have a ZX81 and 16k Rampack. For a while I have been contemplating buying a ZX printer. But, for my computer course at school I have an Acorn Electron to help me. Is there an interface that will let me run a ZX printer from an Electron?

A The simple answer is no. Although a number of companies are working on RS-232 printer interfaces for the Electron, I have not been able to find anyone who is working on a ZX printer interface. Also, the fact that Sinclair are to stop production of the ZX printer makes it even more unlikely that one will ever appear.

Across The Pond

Marcel Basi, of Aberdeen writes:

Q I will have to leave for the USA in a few months time. I have got a BBC model B and I would like to be able to use it over there. What exactly do I have to do to modify it so that it will work in the States without any problems?

A I am indebted to Bill Murray of the RAF for the answer to this question. Bill has recently returned from the States and he wrote to me of his experiences, which were:

- 1) take a British tv with you
- 2) buy a 120-240 volt transformer before you go
- 3) you will need to replace all

your plugs when you get there as US plugs are much smaller

Bill also suggests that, as computer prices are so much lower in the States than they are here, it might be cheaper and simpler for you to buy a new machine when you get out there.

Financial Times

D. P. Harrison of Fredrick Street, London writes:

Q I have had a 48k Spectrum for some months now.

I am at the moment writing a financial program which requires saving string and numeric variables at one point and then reloading them back into the program at a later stage for further calculations. I have been having trouble reloading the data back in. I have seen similar programs where files are used for address book-type programs, but not for a mixture of string and numeric data.

Could you let me know the solution to this problem?

A I don't know whether I can solve your problem but maybe an example would help.

```
10 DIM a$(20,12)
20 DIM v(20)
30 FOR i = 1 TO 20
40 INPUT "SALES STAFF"
   LINE a$(i)
50 INPUT "VALUE OF ORDER"
   LINE v(i)
60 NEXT i
70 SAVE "names" DATA a$(i)
80 SAVE "vals" DATA v(i)
```

The above program will accept details of 20 sales staff. The information entered is the sales person's name and the value of orders taken. Lines 70 and 80 save this data on cassette. To load the data back in to the program you need to use: Load " " Data v(i). I.e. you need to reload your data into either the same or similar arrays (the Dim statements must be the same).

I hope this helps you on your way.

Locked-Up Games

R Barnes of Peterborough writes:

Q Could you tell me why some machine-code games on my 1.20S BBC Model

B lock up as soon as they have loaded and are ready to be played. My computer is normally reliable, and the same games such as Acornsoft's *Snooker* work perfectly well on a friend's 1.20S BBC.

I hope that you'll be able to tell me the solution to this — knowing me it probably has a very simple explanation.

A Unfortunately not. I wonder if you have disc drives connected? Loading problems associated with discs on the BBC (some makes of drive) are quite common.

If you have a cassette-based system, have you tried your recorder with your friend's BBC? If it doesn't work you know you need a new recorder. If that isn't the fault I suggest that you take your computer to your friend's house and try and load using his set-up onto your machine. If it doesn't work then you would be well advised to have your computer tested by an Acorn dealer.

Control Characters

B. Coleman of North Hyeham, Lincoln writes:

Q Basic programs published in magazines and books often use a command to position the cursor when row and column numbers have been included. For example, Print Tabl (C, r); "x", where c is the column, and r is the row.

This does not work with the Aquarius. Can you please tell me the correct formula?

A No facility exists in standard Basic to do this on the Aquarius. This same problem has been faced by Vic20 owners for some time.

The only way round it in Basic is by including the correct number of Newline and Cursor Right control characters in each string to be printed — which is pretty tedious.

The lack of a Tab facility on

the Aquarius means that getting good screen displays is a very laborious process, I'm afraid.

Full-Size Copies

R D Appleby of Cwmbran Gwent writes:

Q Do you know of a program that will screen dump on a Seikosha GP-250X printer at a 64-character width? I have a 48K Spectrum and need to do full-size hard copies.

I tried to write my own routine using the printer codes in the Seikosha manual, but was unsuccessful.

A One program that would serve your purpose is *Taswide* produced by Tasman Software. When used in conjunction with Tasword 2, this will allow screen dumps such as you require to be produced. *Taswide* itself allows up to 64 characters per line (on the screen).

For more information on the range of facilities available I suggest you contact Tasman yourself. The Address in Tasman Software, 17 Hartley Crescent, Leeds LS6 2LL.

Alarm System

Kevin Stone, of Basildon, Essex writes:

Q I would be interested to know whether a ZX81 or Spectrum can be used to control a burglar alarm system on a house, and also whether there are any books on the subject.

A It is indeed possible for either of these machines to be used to control an alarm system. A useful introduction to the subject would be *The Spectrum Hardware Manual* by Dickens published by Melbourne House, and available from most computer retailers.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem **Peek it to Phil Rogers** and every week he will **Poke** back as many answers as he can. The address is **Peek & Poke, PCW, 12-13 Little Newport Street, London WC2R 3LD.**

CLASSIFIED

Semi-display — £6 per single cc

Lineage — 25p per word

CALL DIANE DAVIS ON 01-437 4343 FOR SEMI/DISPLAY ADVERTISING

WANTED

WANTED CBM 64 secondhand software in good condition complete with instructions paying standard £2.50/£3 per cassette. A P Berry P O Box 82 Basildon Essex SS16 5WJ

WANTED Software for TRS 80 colour computer pyatt Orpington 20281. Evenings

WANTED: Disk drive for Atari 800. Tel: 01-954 5275.

VISIONARY VOLTAGE

Requires M/C arcade and adventure game program for Commodore 64, VIC 20, Spectrum and BBC Electron. Also programmers capable of translating between the above (based in London Area/Middlesex). Please send cassettes with loading instructions, and details to:

Visionary Voltage
34, Bendemeer Rd,
Putney
London SW15

STOLEN BBC micro, model 'B', unmodified, Serial no. 10ANB 013050166. Reward offered. Telephone: 01-954 2311 x4325 (day).

I.G. PROGRAMS

Urgently require original high quality arcade games programs for the Commodore 64 and the 16/48K Spectrum. We are looking for M/C programmers to work to our specifications on the Spectrum and Commodore 64. For high royalties and initial payment contact:

THE SOFTWARE MANAGER, I.G. PROGRAMS,
23 Newall Truck Road,
Chippington, Wilt. SN15 3NL.

WANTED YOUR SOFTWARE

WIGHTSOFT will pay top royalties for good software for VIC 20, CBM 64 and SPECTRUM

We want original games, arcade and adventure, utilities and educational programs. Send your programs, or for more information, contact:

WIGHTSOFT
OLD MILL FARM
BLACKWATER
NEWPORT
Isle of Wight
Tel: 0883 525703

HELP? Have you written any good arcade adventure or strategy games? Your program could be better than you realise. We will give you free appraisal and help with marketing. Don't hesitate! Send tapes with instructions for quick reply to: 4TH DIMENSION, UNIT 4, 4TH AVENUE, BLUEBRIDGE, HALSTEAD, ESSEX.

SUNSHINE

A serious author has new titles to add to his highly original and successful book range. Experienced and first time authors are invited to submit manuscripts direct or by post to: David Lawrence, Book Editor, Sunshine, 12-13 Little Newport Street, London WC2R 3LD

Sunshine Publishers of Popular Computing and Electron titles

WANTED: Used original software at popular computers, any quantity. Send list for immediate cash offer. Computamart, 195 Seabourne Road, Southbourne, Bournemouth, Dorset.

AGENTS WANTED

To supply hardware software to clubs, homes, schools, etc. Up to 25% commission. £20.00 worth of free software with your first accepted order. Send for details to Home Base Micro Supplies, 4 Queenswood Avenue, Northampton

CLUBS

SPECTRUM USERS

Don't risk your hard-earned cash on untried programs! Buy from Quickmicro Software Club and if you are not satisfied, we will buy them back. All the latest and most popular Spectrum arcade games, adventures, strategies and simulations. No charge for postage. Send S.A.E. today for details to:

Quickmicro Software Club,
2, Woolley Avenue, Poynton,
Stockport, Cheshire, SK12 1XU.

SECOND SOFT. Spectrum and BBC tapes for hire. £1 for 2 weeks, 100's of titles. For details send S.A.E. to: Second Soft, 271, Parnfield Rd., Chesham, Herts. EN8 0TP

BBC DRAGON SOFTWARE LIBRARY

Why buy tapes when you can hire up to 7 for the same price. Membership free £5. Tapes £1 + 25p p.p. Catalogue growing. Write: E. Tucker, 8 Springwood Estate, Grimston Rd, Stn. Woolton, King's Lynn, Norfolk

BOOKS

BODY — POPPING, break dancing. All styles of disco. Teach yourself. SAE for details. Dance Publications, 136 Monkhill Lane, Pontefract WF8 1RT

THIS SPACE FOR SALE

£18

TELEPHONE:
PCW CLASSIFIED
01-437 4343 Ext 206

FOR HIRE

TO HIRE a computer from Spectrum 48K upwards, please phone or write to: Business & Computer Services, 249a Caledonian Road, London N1 1BA. Tel: 01-607 0157.

BBC SOFTWARE LIBRARY

Why buy programs when you can hire for a fraction of the cost from the BBC Library. See Large Varied Selection of Software etc. See Catalogue growing weekly etc. See huge rise from £1 per hour to £1 etc. Software at big discounts etc. We offer a fast, quality service at competitive rates. (8 day membership inc. first program free). Send cheques for £5 payable to BBC Library or see for details. BBC Software Library, 18 Mandrake Crst, Beach Hill, Wigan, Lancs. Tel: 0943 47674

COMPUTER VID. Unique rent a tape service from £1 a week. If you like the game we take a rental fee off the cost of the game. £5 life membership. Available for popular computers. Write to: 278a Wightman Road, Hornsey N8. Tel: 340 4074.

TO HIRE a computer from Spectrum 48K upwards, please phone or write to: Business & Computer Services, 294a Caledonian Road, London N1 1BA. Tel: 01-607 0157.

EDUCATIONAL SOFTWARE

CBM 64

• animated • FLASHCARD & SPELLING • manual • ages 1-7 years. Developed in conjunction with school and educational psychologists. Cassette £4.50. Disk £7.00 incl. pp. **TABLETSOFT**, 1 East Lane College, Brixton, S.W.20 8EJ

CLASSIFIED ADVERTISING RATES:

Line by line: 25p per word, minimum 20 words.

Semi-display: £6 per single column centimetre, minimum length 2 cm. (Please supply A/W as P.M.T. Or supply rough setting instructions.)

Conditions: All copy for Classified section must be pre-paid. Copy date 7 days before publication.

If you wish to discuss your ad, PLEASE RING Diane Davis 01-437 4343.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

Please continue on a separate sheet of paper

I make this words, at per word so I owe you £

Name

Address

Telephone

Please cut out and send this form to: Classified Department, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

GAMES SOFTWARE

SPORTING forecasts programs by Professor Frank George for Commodore 64, BBC, Electron, Spectrum, Dragon Horse Race Forecast, Football Forecast and Poolroom now available. Details from Poringware, PO Box 161, Brundall, Norwich.

SPECTRUM 16/48K, "Raguel" presents for games pack for ages 16 and over only (state age when ordering). Still only £3.50. I. Brooks, 17 Mahvern, Coleman Street, Southend, Essex

CALLING ALL ZX81 OWNERS!

A refreshing new game for your 16 K. Race your own horses

against those of the famous personalities in:

THE RACING LEAGUE £3.50 INC.

Only from:

RACING LEAGUE SOFTWARE

22 Lindale Garth, Kirkhamgate, Wakefield, W. Yorks. WF2 0RW.



"Only aliens sell computer games for £1.99!" says Zog

On our planet CBM 64, Spectrum, Vic 20, and BBC games cost only £1.99 — Why pay more?

Top quality, fully packaged games like: Election Game, Subhunt, Ghost Hunt, Panic, Hekuk, Undermine, etc. Send SAE (or phone) for details to our earth branch at:

Aken Software,
46 Watling Ave.
Edgware, Middx.
Tel: 01-951 4641.

48K SPECTRUM HEAVYWEIGHT BOXING

from

MERRON SOFTWARE

- * Choose your training
 - * Improve your strength
 - * Then you're ready for 12 rounds of boxing
- Can you become Heavyweight Champ?
Cheques/P.O. for £5.50 payable to

MERRON SOFTWARE

64 Carigan Lane
Leeds LS4 2LD
SEND NOW!!

LYNX

**FLIGHT
SIMULATOR**

Machine code program for 48/96K LYNX. Realistic — many features — 3 airports — 15 beacons — joystick option.

Price includes P&P. Flight manual and maps. CH-POs for £8.50 to:

LCS.

21, Menhobe Close,
Blackburn, Lancs. BB2 7DR.

FOOTBALL LEAGUE TEAM

Manage your own Football team from the 4th Div. to 1st Div. Champion! Only £3.50! EXCELLENT VALUE ON ALL THE FOLLOWING:
Vic 20 - 8K, 16K
Electron 9603
16K Acorn
Cheques/P.O. to
D. Spencer, 50 Cranwell Rd.,
Sittingbourne, Cleveland.

SURVIVOR. 48K Spectrum. Survive the aftermath of a nuclear war. The Adventure game you could play for real one day. £4.95 from Redwhite Software, 23 Thornhill Street, Cardiff, CFS 1RD.

SINCLAIR software minigames — an absorbing 48K spectrum program containing nine games including othello, avert, solitaire £3. High resolution graphics for ZX81 without hardware £5 (four star review in hew). Replacement keyboards for ZX81 £3. Spectrum upgrade £21. See list. Odyssey computing, 26 Bingham Road, Sherwood, Nottingham

2 Games for the price of one for the BBC 'B'
"SAFARI" & "STRAWBERRY ATTACK"
(arcade style games) — £7.95

Cheque/P.O. to:
M2 Software, 8, New Hall Croft, Leeds
LS14 6DA. Tel: Leeds 641956

STEP INTO 2 FEET!

How about the size? 25% off all computer games e.g.
Sabre Wulf £7.48 Muggsy, £8.20.
Phone 04862 89803 or
send cheque/P.O.

To:
Melmarcy
Hollybank Rd.,
Woking, Surrey.
Take 25% off retail price of games.

J. SHAW

ATARI SOFTWARE SALE

M.A. ORDER ONLY

Post Position	£34.90
Forbidden Forest	7.50
Savage Pond	7.50
Popeye	27.60
Fighter Pilot	7.50
Atari Challenge	7.50

Cheques & P.O. payable to
J. SHAW. Send for list
180 Midhurst Road, Brighton.
Githam, Lancs. OL2 5LS

SPECTRUM AND CBM 64; DISCOUNT SOFTWARE.

eg. Blue Thunder £4.80 (Spectrum).
Split £3.50 (Commodore 64).

Free postage-delivery. Quantum
Software, 30 Halam Grange Rise,
Sheffield S10 4BG Tel: (0742) 305077

SOFTWARE

COMPUTER SOFTWARE: BUSINESS AND GAMES FOR MOST COMPUTERS.

Commodore 64, VIC 20, BBC,
Atari, Dragon, Spectrum,
MZ700, ZX81
New releases for CBM 64,
Spectrum, BBC, Atari, Dragon,
Spectrum, MZ700, ZX81
New releases for CBM 64,
Spectrum, BBC. Every 8
weeks — just send S.A.E. and
we send you a new list every 2
weeks
Altai C10 data cassettes 40p
each. 5 C15 data cassettes £2.40
5 1/4" floppy discs Divided —
OL density, £2.30 each or 5 for
£10.

Send to: M.J. Seaward, St.
Olaf's Road, Stratton Nr.
Buck, Cornwall EX22 5AF
Tel: (0288) 4179

COMMODORE 64 SOFTWARE SPECIALS!!

30 Tactics. Haunted Castle.
Presence. Ludo. Foot. Pongon &
30 Maze

All with superb graphics for £7.95

- A) Character Designer Latches
matched Special Features. £5.95
- B) M.C. Action Utility. Special
Features. £4.95
- C) Disc to Disc (full cover with
write protection selection). £12

You may have A, B & C for £10
fully inclusive (Special Offer) Basic
Compiler (Superb Utility). Minimum
speed of completed basic pro-
gram (peak & peak) 62 times
basic. Tape £21.65 Disc £24.95
with full manual and demo. "On
cassette only. Stamped S.A.E. or
ORDERS to C.P. White (Services)
54 Northfield Avenue West Easing.
London W13 1FR

88% ROYALTIES PAID

DUST COVERS Protect your invest-
ment, made-to-measure, top quality.
Printers, drives, keyboards £4.50, VDU
£5.50 Inc. p&p. Olive or Navy. Measure-
ments to:- Sue Smith, S & S Textiles,
Brookside, Diseworth, Derby. Tel. 0332
- 810099

SUMMER CLEARANCE SALE

	R.E.P.	Our Price
World Class Darts	£6.95	£4.95
Atts N Match and Maximind	£6.95	£4.95
Stock Control Database	£10.95	£7.95

All 3 for ONLY £15.95
Send cheques/P.O.s (p&p inc) to:
ALPHASOFT,
7 Miles East Avenue,
Langley, W. Yorks. YO21 4SE
(Home day telephone)

HOME ACCOUNTS. Put your house
in order! Probably the best home use
for your computer! Comprehensive cov-
erage of bank accounts, credit cards,
HP, etc. Inbuilt accuracy check for all
transactions. Projects cashflow for any
period ahead. Available for CBM 64 or

DRAGON OWNERS

You can now make use of ITV's Me and
My Micro series with our full set of listings
and information for Dragon owners. Send
only £1 to

ORON SOFTWARE

64 PRINCE STREET, ROCKDALE
LANCS. OL16 8LJ

VIC 20. £7.50 or FREE details from
DISCUS SOFTWARE, Freeport,
Windmill Hill, Brixham, Devon. TQ5
9BR. Tel: 090 45 55532.

DEALERS

SPECTRUM'S SERVICE AND REPAIRS

MAKE ORDER OR CALL IN
HUGE

selection of software and full
range of accessories SAE for lists.
Enfield Communications,
135, High Street,
Ponders End, Enfield, Middx.
TEL 01-805 7434.

LANCASHIRE MICROS

ACORN/BBC, SINCLAIR, COMMODORE,
ORIC, MINOTECH, DRAGON - LYNX PER-
SONAL COMPUTERS.

We have a very wide range of software, books
and accessories, including over 280 titles for
the Spectrum alone. Send SAE for free list
88 BENTLEY ROAD,
WIDENESS,
Lancashire
Tel: 01436

Access

**Book
your
Classified
or
Semi-display
ad by
Credit
Card**

**Call
Diane
Davis
on
01-437 4343**

BARCLAYCARD

VISA

COURSES

SPECTRUM owners. Structured touch typing course gives you and your children this important skill. Free program eliminates keyboard. Only £3.50. Robert, Gwysfa, Conwyrd, Pannannew, Gwynedd

HOLIDAY COURSES FOR CHILDREN

NOW BOOKING
(£45 for 5 mornings)
(Adult courses as usual)
Ring: Computer Workshop
on 01-318 5488.
4, Lee Illich Road,
Lewisham, London SE13 5LQ

MAGAZINES



DRAGON USER

To make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly, subscribe direct to us. A year's subscription costs £10 for 12 issues (overseas rates available on application). Send a cheque or postal order made payable to Dragon user, and accompanied by your name and address, to Dragon User Subscription Department, Oakwood House, Perrymount Road, Heywards Heath, Sussex RH16 3DH.

Computer Swap 01-437 4343

Free readers entries to buy or sell a computer.
Ring 01-437 4343 and give us the details.

For sale

ZX PRINTER and paper £30. Spectrum Scrabble £8. Chessit "Sweet talker" £20. ZX81 16K Rampack £7. Tel: (0232) 231716

ORIC 16K, boxed, 4 months old, 5 arcade games, 2 bios, excellent condition £60 ono. Tel: 574 3112

OL FOR SALE, brand new. Offers. Ring 573 6442

SHARP MZ 700 computer, complete integral cassette deck. Printer. Plotter, s/w. Spare pen & paper for plotter. Boxed as new. £275 ono. Tel: 01 983 0196

ELECTRON games originals Triple Simulation, Lybantom Mission, Escape from Moon Base Alpha, £15.00. Tel: Sandy Area 0632 394281

TRS 80 level 1 basic lessons, 4 cassette, £5. MFI computer desk, £10. Must collect (Swindon) 0793 870627

ORIC 1 48K, as new and software, including Harrier Attack, Donkey Kong, Dracula's Revenge plus three other games. Only £130. Tel: (0705) 526862

ORIC MCP40 printer. Complete with roll of paper. Used only once, hence excellent condition. £100 ono. Tel: 0705 31239

ZX PRINTER + rolls of printer paper. Will swap for Currah Micro Speech or sell for £35 ono. Telephone Hornchurch 57487

TEXAS TI 99-4A speech synthesizer £35. Pirate Adventure Game with Adventure Module £15. Tel: Hornham (0403) 55060

SEKOSHIA GP100A Mk II printer for sale. Hardly used, excellent condition. Five months guarantee, only £140. Phone 0792 58894 any time.

FOR SALE Electron joystick interface in perfect condition, under £15.00 ono. Write to: 46 Southwell Close, Kirby in Ashfield, Notts, for details.

CURRAH SPEECH pack: excellent condition £20. Or will exchange for ZX printer. Tel: Farnham 897018

SOFTKEX SPECTRUM integer compiler in video box with instructions, £7. Over £50 worth of mags including PCW, HCW, Sinclair User, Your Computer, Electronics and Computing for £15. Tel: Loddon 20219

CASIO FX 700P pocket computer, calculator. In excellent condition. Only 4 months old. £35 ono. Phone Dave at Heathfield (04352) 2505 evenings.

ORIC ATMOS 48K new, boxed, bargain at £130. Also Oric Software, PSS, Invaders, Hopper, Centipede, £12. J.K. F. Quest, Xenon 1, Z/Revenge £15, Hobbit, £8, Tansil, U/Zone, Rat Splat, £10. Tel: Dave (0268) 550855.

TI 99-4A peripherals required. RS232 card, internal disk drive, disk manager and controller, editor/ assembler, p-code card, assembler linker, and editor file. Phone Neville on 0703 538156 from 9am to 7pm

CASSETTE TAPES, individually boxed, C-60 pack of ten. Good quality unused, unwrapped £3.00 only. Alton 87844 after 5.00 pm.

SHARP MZ-700, 64K ram, built in cassette, and clock, five games, all for £175. If interested contact J. Martin, 11 Rosina Street, Higher Openshaw M.C.

ZX PRINTER for sale (£26) or will swap for Currah Speech unit. Four rolls of paper and printer (£37). Mr K Burton. Tel: (0226) 292118

VETREX COMPUTER system, duplicated gnt, unused, still boxed. No TV needed. With 5 superb games. Cost over £200, bargain at £120 ono. Must sell. Tel: 01 842 8478. Sutton, evenings.

HEWLETT-PACKARD HP-41C computer and calculator hardly used. Absolutely as new. Includes handbook, programming guide, standard applications, quick reference etc. Original box. £75 or swap for VicCMB/Pet (0244) 675717

ZX PRINTER for sale. Little used. 9 months old. Manual + 7 rolls of paper. Worth £55, sell for £30. Phone Chris on (0788) 632478 after 5pm. Write to: 4 Cord Lane, Easenhall, Rugby, Warwickshire, CV23 0HZ.

48K Oric 1 plus £110 of software including The Hobbit, FORTH, Hunchback etc. £130 ono, or swap for Commodore 64. Tel: Wilton (0965) 42247 after 4pm.

QUICKSILVA games designer original as new £3. Phone 0933 222543

SORD M5 — bits of original software for sale — send SAE #1 A Hendry, 5 Greenfield Ck, Coulson, Woods, Coulson, Surrey CR3 2SW for details. I'll also consider swapping programs.

CURRAH MICRO speech hardly used £24. Deethchase, Pinball Wizard, Ant Attack, Zip Zap, Timegate and Star Trail £3 each. £15 the lot. Phone 0805 21871

ELECTRON CASSETTE games for sale. All originals. Moonrider, Croaker, 747 Flight Simulator and Escape from Moonbase Alpha. £17 the lot. Phone Kings Lynn 828872 after 4pm.

ORIC 1 48K brand new, unwanted gift. Guaranteed £85. Tel: Ashford, Kent. 20483 evens.

CASIO FX 702P pocket computer SAR cassette interface. FP10 printer original box. £80 or best offer. Tel: 01 902 7402 after 5pm.

ITT 2020 48K, 2 Apple disk drive s/w + bios. Best offer. Over £350. Tel: after 6pm 69613

ZX MICRODRIVE + interface I. As new. £85 ZX printer. Rolls of paper £20. Tel: (0908) 613900.

MCP 40 4 colour printer plotter, 1 month old, boxed + instructions £100. Tel: 0432 271275 after 6pm.

400K DISC DRIVE for sale with over £1000 of BBC s/w (call original) ie: Disc Doctor Rom, business + latest games. £1000 + sell for £450. Tel: 05827 69152.

16K SOLID side ways Ram board for BBC supplied with and £1500 most roms eg wordwise etc. Worth over £1500. Sell £150. Tel: 05827 69152.

PCW BACK issues also HCW, PCN some monthlies. Tel: 0258 60840 (after 6pm).

INTELLIVISION games less than 1/2 price. Also imagine games swap for new ones. Tel: 958 8643 Andy. All original

TEXUS T1994A + cassette + interface leads, Joysticks + cartridges + cassettes + program books. £150 ono. Tel: Orpington 37885.

MCP 40 colour printer, plotter wider, 3 months old. Hardly used. Original boxes. £100. Tel: Southend 552 484.

PHILIPS GT000 6 cartridges best of. Ace tronic + Alan cartridge £8 each. Tel: 01 885 1185.

TEXUS T1994A Joystick, tape recorder 4 modules ie: Chess, Munch Man, Beginners Household Management. Perfect condition. £50 ono. Tel: 01 586 8876 evens

WANTED 48K Spectrum, pay £60. Tel: Pod 01 348 7378

EPSON HX20 with micro cassette £320 and brother EP22 (Typewriter/printer) £5232 £100. Tel: 01 733 9961

EPSON FX80 Hi-Res Dot Matrix top of range. Perfect. Guarantee owner upgrading. Only £330 ono. Tel: 01 674 7795

SHARP MZ80K, 48K built in monitor and tape recorder. Basic language manual, book and various tapes vgc. Boxed £220 ono. Tel: 0632 836110 Newcastle.

FOR SALE HCW nos 1-24, 27-33, 35-50, 15p + 15p p/p each or the lot for £4 - £1 p/p. Write to K.L. Chan, 9 Cornmarket, Thame, Oxon, OX9 3DX.

SEKOSHIA GP 100 A Mark II Dot Matrix printer. Centronics compatible. £160 incl. delivery. York 480109. Hardly used.

FOX PROGRAMMABLE joystick interface for Spectrum + Quickshot II Joystick. Excellent condition. Together £48. New, accept £23. Tel: (061) 338 3841 evenings.

TI 99-4A EXPANDER, Basic games cartridges, joystick, books, mags, s/w, leads, excellent condition. £100. 0494 716590 after 5pm.

ORIC 48K tape recorder, £70 & s/w inc: Hobbit + Oric Trek + Books, leads, £140 ono. Tel: Simon (0274) 726166

MEMOTECH MTK500 computer, 5 mths old boxed + guarantees, 8 tapes, cassette recorder, Quicksot joystick, £300. Tel: Latham 75452.

DOT MATRIX printer 80 column graphics. Character and double width mode. Switch selectable input. Parallel or serial interface. Suit most computers. As new £185 or no. (0802) 725930.

ORIC 1 48K + S/W worth £100. All leads + manual, books, guarantees. John 0625 879064. £99.00.

SHARP 1245 pocket computer, 4 weeks old. £30.00. Tel: 01 521 1058.

FOR SALE. Stonechip programmable Joystick interface (still under guarantee) plus pointmaster joystick £25.95. Phone Rob 061 828 8354.

SELLING BROTHER EP20 Electronic Typewriter for £75. Very little used. Built-in calculator and LCD display. Includes foreign characters. Battery or mains operated. Would swap for micro-drive and interface. Dave 01778 5873.

LYNX 48K + S/W. Highest offer secures or exchange for CBM disc drive. Tel: 01 691 0118.

ACE TRONIC MBU 1000, 3 cartridges £25. Cassio MT. 45 £80. Tel: 01 809 2841 K.T. Cheung.

ORIC 48K book + cassettes inc: machine code FORTH and Hunchback sell £90.00. Tel: 01 393 8550.

ORIC 48K with lots of s/w based games worth £200. Excellent condition, sell for £100 or swap for Spectrum 48K with Accessories. Tel: Southport 321 44.

LYNX 48K, boxed as new, unwanted prize. £150 ono. Tel: 01 570 8335. Bob Harris.

SEKOSHIA QP50 printer Centronics new. Not used. £125. Moby interface for Election. 01 771 0895.

TI 99-4A manual + games for sale. £55 ono. Tel: Medway 6334.

FOR SALE or exchange motor roller 01 kit for microdrive and interface or best offer Mr Morgan 0685 878545.

COLLECTION OF S/W. Many titles inc: Lunar Jet Man, Dictator, Pogo, Derby day, Motion Malt. Offers to Hertford 52591 (Nigel).

ORIC 1 original s/w to Hobbit £700. Ultimazone £4.00, Munch £4.00 + more. Tel: 0625 877498.

TEXUS T199 4K, 2 powerful languages. Extended Basic. Many memory £80 of s/w. Joystick, cassettes, leads. Good condition. Manuals. Worth £300. Sell £120 ono. Tel: Basildon 557585.

FOR SALE, Verdex computer games system, with full sound and speech synthesis, including 5 cartridges, Scramble, Hyperchase, Pinball, Soccer, Starhawk, Minestorm. Paid over £200. Want £150 ono. Tel: 01 642 8478 evenings.

SHARP MZ 80K, integral monitor and cassette deck, 48K ram. With centronics printer interface and £230 of software. All for £250. Phone (evenings/weekends) Manchester 439 4841.

FIREHAWK AND BEEGE by Postern for any Spectrum. Only £3 each or £5 both. Blind Alley by Sunshine for any Spectrum only £2.50. All in v.g.c. Ask for Matthew 050 270 339.

Good quality printing ZX printer complete with two rolls of paper and servicing information. Fully boxed and reliable. £30 ono. Phone Bakuwell 4121 after 4pm. Will deliver within reasonable distance.

MICRODRIVE and interface 1 for Spectrum, 2 extra blank cartridges and book. £95. Tel: Mansfield (0623) 742984.

FOR SALE: two ZX microdrives brand new. Only three weeks old. Have to sell. Ordered CL. £35.00 each post paid. Phone 0226 82645.

FOR SALE: Brother EP20 personal electronic printer. Boxed as new. Cost £158. First with £85. Post paid. Phone: 0226 82645.

CURRAH micro speech as new. one week old. Unwanted birthday present, worth £30. Asking for £25 ono. Phone Glasgow (041) 429 2903 between 5 and 7pm ask for Jaz.

SHARP MZ80A as new. Plus some software. £250 ono. Phone Scarborough (0723) 369009 after 6pm.

ORIC 1 48K several games and books. Worth £200. Will sell for £120. Contact Grahame on (081) 477 9076 after 6pm.

LYNX 48K as new. Boxed with manual and leads. Also includes Serial Printer software pack and Sinclair's Lync Computing book. £130.00. Telephone Coggeshall, Essex (0376) 62630.

COMPETITION-PRO joystick V.G.C. with box. To fit any system with a nine pin D-plug. £5.00. Tel: 0291 680 840.

SHARP PC1500, plus printer interface 11.5K ram with softboard sharp cassette recorder, spare charger, manuals, applications pack. All boxed as new. Cost £250, first £350 secures. Phone Powell, 01 222 4054.

IMPULS by What magazines. Every issue (11 copies) + binder, £13.00. Tel: Romford 67413.

SHARP M280K 48K memory, inc. tape deck + monitor with manuals + £80 of s/w. £200. Tel: (0284) 66219.

LYNX 96K little used, manuals, £210.00. Tel: 01 788 4951.

ORIC 148K + micro line 82" printer + cables £200. Tel: Dartford 214433.

ORIC ATOMOS s/w for Atomos. Send SAE for latest list s/w urgently wanted. Best prices paid for original s/w. Same day supplies. Table top s/w, 27 Giffard Drive, Walland Malvern, Worcester-shire.

COMPUTER CASE similar Superbrain built in VDU, RS232, centronics 100 key keyboard, power supply, 8085 CPU board, etc. Would exchange. What have you got? Tel: 061 432 4538 evening/weekend.

ONE ACOUSTIC modem plus Rom software for sale. Four months old very little use. Price £40.00. Phone 01 748 0320 evening only not Wednesday.

COLECOVISION CARTRIDGES for sale, Venture £15, Ladybug £15, Po-pye £20, Q Ben £18, Zaxxon £17, Mouse Trap £15, Donkey Kong Junior £17, or £100 the lot. Phone 01 7014380.

48K LYNX + loads of software, magazines, cassettes, etc. Serial printer pack, Lynx users, Oust cover. Worth £350. Only £170.00. Phone 042275366.

Wanted

WANTED Fuller FDS keyboard. Tel: 0705 473968.

SWAP Lunar Jetman or COS Pool or Chuckle Egg for your Classic Adventure of Crypt or Thrusta or Bugaboo (The Fly). Spectrum only. Phone Rich after 4.30pm weekdays. Bristol 0272 716947.

SWAP VIC 20 Road Race Cartridge for a Vic 20 Cosmic Cruncher cartridge in good condition. Kettering 522581.

SWAP CB plus all accessories needed for home or car, and C-Scope TR400 metal detector for any computer (not ZX81) or Atari peripherals. Tel: 01-300 1586 after 5.00pm or weekends.

WANTED Cambridge program interface. Will swap for s/w. Kong, Zoom, Ah Diddums, Timegate, many other titles. Other titles for sale or swap. Kempston interface. Tel: BFD 635068 after 7pm.

SPECTRUM originals games s/w to swap. In Astra, Table Trouble, Pyston, Scablitz, defender. Tel: 01 530 5220.

WANTED DISC for CBM 64 games on original or blank. Pay cash. Also swap. Tel: 011 958 8643. Andy.

WANTED 1541 disc drive. Good price paid. 061 222 61917.

SWAP (ORIGINAL) Oracles Care + Espionage Island for any level 9 adventure. Ray Penford 67307.

WANTED BBC Tel: 01-519 2579 (6pm).

SWAP Invasion of the Body Snatchers (Crystal wanted) swap my original s/w for yours. Tel: Ammansford (0269) 4259 eves.

SPECTRUM 48K good condition. £90.00 of s/w. All top games (all originals) like to swap CBM 64 or Atari 800 XL. Tel: Chipping Sodbury 310 278 (0454).

CBM 64 + C2N books, mags, s/w 4 months old £220.00. Will consider swap for 48K Spectrum with accessories. Tel: Slough 32750.

WANTED 16K ram pack for the Vic 20 and Quickshot joystick. Tel: 01 551 3286.

SPECTRUM 16K with £35 of s/w. Joystick interface, cassette player, lots of magazines and 40 channel CB + aerial power pack, and SWR. Swap for Commodore 64. S/w required. Tel: (0582) 599576.

WANTED Spectrum software in any form original programs or anything on tape for 48K. Please send list and price to A Stewart, 11 Strack Place, Elloch Skene, Aberdeen, Aberdeen 742358.

SWAP VIC 20 super screen for games designer or snooker. Also Commodore for Gdrunner. Write to Peter Hobden, 13 Swallow Beck Ave, Lincoln LN6 7E2. Tel: Lincoln 691146.

WANTED Commodore 64 plus C2N Disc drive joystick and printer (8 or over). Tel: Rossendale 216239 after 4pm.

WILL SWAP 15 original Spectrum games worth £85 for interface 1 and micro drive. Also will pay £20 cash difference and pay for micro tapes. Tel: Grangemouth 488120.

WANTED SIMONS Basic for CBM 64. Swap Tascam Zoom telescope 20 + 60 + 80 on tripod. Worth £50 or may consider buying. Phone Ingrebourne 76431.

TEXAS SWAP personal record keeping module for speech synthesiser. Also swap Statistics module for extended Basic module or Pascal module. Please contact Wayne Leary, 105 Wellstone Avenue, Bramley, Leeds LS13 4EH.

WANTED SPECTRUM software, Al-chemi, Vu-3D, Scuba-Dive, Androm II, Codename Mat, Hall of the Things, Backgammon, Scrabble, Black Alley, Oric Attack. Tel: 01 874 8194 (Sankey).

SWAP Brand new 48K Spectrum, joystick interface + £800 s/w for Commodore 64. No cassette deck or s/w needed. Phone Scot on 075 70441 (Scotland).

SWAP s/w (Spectrum) for Kempston interface. Tel: 074 486 2305.

CBM 64 in good condition. No extras. Mr Riley - Tel: 061 980 4357.

DRAGON 32 2 joysticks, £50 of s/w. Swap for Spectrum 48K with extras. Tel: Whitland 240683.

48K SPECTRUM wanted with compatible tapes recorder, leads and manual with at least 5 months guarantee. Willing to pay up to £100 if games included. Tel: 01 980 0731.

I'M WILLING to purchase all original Spectrum s/w. Preferably in bulk. Good prices paid. Tel: 01-348 7378.

WANTED VIC 20 + C2N cassette. No s/w. Willing to pay £80/90. Basildon 282035.

SWAP ZX MICRODRIVE for Alpha Com 32 printer Games designer and Vu-3D. For Tasman word processors. M-Orse version. Tel: H/H 66641.

WANTED reject or non-working computer for small child. Tel: 0493 740951.

48K SPECTRUM Quill to swap for The Hobbit. Tel: Carnoustie 53131.

WANTED broken Spectrum for taking parts. Tel: 01 539 5402 after 6pm.

2 CB RGS 40 channel, 1 Power Pack, 1 Oscar Anal 1 SWR. All good conditions. Swap for 48K Spectrum good condition. Tel: (0403) 67296.

SWAP SPECTRUM s/w. Jet Set Willy, Astrada, Moon Alert (original). Tel: 01 476 8884 (after 6pm).

COMMODORE 64 software to swap or sell. Titles include Colossus, Chess, Zeppelin, Critical Mass and many more. Contact A Gerard, Boite Postale no 118 Liege X Belgique. [All letters answered.]

SWAP SPECTRUM education s/w. Paddington shopping and picture problem. Sinclair read one, ABC lift-off, Alphabet and countabouts. 01-800 6767 after 7pm or weekends.

WANTED KEYBOARD for Spectrum in good condition. Tel: Bradford 503332 after 6pm.

SWAP VIC 20 + 7 cartridges + 9 cassettes + joystick + cassette deck for an Apple II, II+, IIE. Tel: (Aldridge) 61010 and ask for Alan.

SWAP 48K Oric 1 + £40 software + 1 Book for Casio PB100 + £70 or sell alone for £100. Phone Stafford (0785) 211445.

WANTED, T199/4A extended basic cartridge, joysticks, any other hardware? Phone 0482 868395 after 5.30pm. Ask for Mike.

SWAP VIC 20, cassette recorder, joystick, Intro to Basic Part 1 and software worth £50 for Acorn Atom (12K + 12K) or sell £110. (Any computer considered for swap). Telephone 051 678 2257 (Merseyside).

WANTED COMPUTE! (US magazine) March 1983 to February 1984. Will pay cash or swap unused Commodore 64 software. Tel: Tyneside 4108600 (eves). Ask for Paul.

SWAP TANDY PC4 pocket computer with Rampack, printer, cassette, interface. All in case, 6 months old for Centronics, printer for Dragon 01 908 0519 evenings.

WANTED SPECTRUM 48K in good condition, willing to pay £50-80. No games needed. Please ring 01 5395402 after 6pm.

WANTED TO BUY or exchange, ZX81 tapes. Send your offers to John Walton, 26 Lord St., Little Lever, Bolton. All letters answered.

WANTED Cambridge Computing programmable joystick, plus interface, plus cassette. Must be in good condition. Will pay £18. Tel: Motherwell 0696 69151.

SPECTRUM ORIGINALS, Oracles Cave, Pitman Seven, Zoom, Colossal Cave, The Island. Swap the lot for the Quill by Gilsoft. Write to Douglas Durin, 1/4/1 Muirhead, University Hill Stirling, Stirling, Scotland.

WANTED, QUILL + instructions in swap for Post, Cookie, Trans Am, Ostron, Gangsters, Turbo, Ungel. Tel: Conn on 868 4124 after 5.30. Will not wait long.

SWAP WATCH (Charlton) for any adventure for Dragon 32. Tel: 01 397 8017.

WANTED Com disc drive. Tel: 0204 694407.

IF YOU OWN Cambridge Computing joystick or Vu-file or Jetset Willy please phone me now on Staines 57086 and ask for Farley Software for sale too. Any problems are also answered.

LOOK Look educational 48K Spectrum software. Send SAE for list. Approx ages 7-13, Workhouse, 37 Lodge Rd., Walsall or Tel: 021 357 2889 for immediate dispatch.

WANTED COMMODORE disc drive for about £120. Tel: Longfield 4976.

WANTED AQUARIUS tape recorder, willing to pay £30-40, ring after 6pm. Ask for Nathan, Phone Stafford 3450.

MANIC MINER additions. Now you can visit any room, swap rooms in mid game only £1. Send cheque or P/O to Mark Hartley, 8 Dawn Close, Chetto Heath, St. Helens, Merseyside.

WANTED 48K Spectrum. Willing to pay £80. Tel: Stafford 780248.

CBM 64 software to swap. Titles include Colossus Chess, hard hat Mack, Fort Apocalypse and many more. Contact A Gerard, Boite Postale, No 116 Liege X Belgique [all letters answered].

SWAP GRIFTER XL bike excellent condition, for these C64 games: Grid Trap, Manic Miner, Aztec Challenge, Revenge Mutant Camels, Scope, Kong. Ring (021) 554 2631 (or swap for Adam Spectrum, Scope.)

WANTED 48K Spectrum issue 3 will pay £60.00. Contact Andrew on Basingstoke (0256) 795897 after 6pm.

ZX81 and Spectrum s/w swap. ZX81 s/w for sale or swap for Spectrum s/w: Football Manager, Asteroids £2 each. Also swap Spectrum tapes: Dallas, Derby Day etc. For Lothians, Jeff 021 779 3026.

WANTED 48K Spectrum issue II with leads and manual, with or without tape recorder. Will pay up to £70. Tel: Basildon 22081. Must be in Essex.

SWAP DRAGON 32, for Spectrum 48K, Oric 1, 48K, or 32K Colour Games. W.H.Y. Tel: Luton 421534 or write, Paul, 4, Ridgway Road, Luton, Beds, LU2 7RR. Sell £95.

TO SWAP Sony Walkman for ZX81, 16K and typewriter keyboard or sell for £50. Ring Terry, on Runcom 88548.

SWAP SPECTRUM games. Tel: 01 567 9490 after 4.30pm.

WANTED SPECTRUM s/w no ancient titles required. I will swap or buy. Tel: Paul Harpenden (05827) 60061.

WANTED 16K Rampack for ZX81. Tel: Ringwood, 78226 (Hants).

WANTED CBM 64 s/w to swap. Tel: Northwood 26322. Or send SAE 16 Lynwynd, Northwood, Middlesex HA8 273.

SWAP or sell CBM 64 disc or cassette games (original). Tel: 01 958 8643.

SPECTRUM 48K wanted. Recorder not needed. Will exchange for Philips G7000 Videopac games Computer + 2 cartridges + £70 cash. Tel: 0481 35849 after 6pm.

SWAP DRAGON 32 plus £250 software, joysticks and manuals for 48K Spectrum or any micro plus software or sell £240. Tommy Walsh, 38 Glengrove Drive, Paisley, Scotland 041 684 5628.

WANTED Aquarius full sound colour computer with 16K ram, plus leads, boxes. Manuals etc. Will pay £35-£40. Tel: Barry (0446) 736131 after 4.30pm.

SWAP FOUR top 16K Spectrum games for working 16K ZX81. Write to 100 Downhill Road, Rayleigh, Essex SS8 9LT. Urgently please!

DRAGON OWNERS wanted to swap programs and information for the Dragon 32/64. Contact Tom 3 Wantage, Woodside, Telford, Salop TF75PA, or telephone Telford 851237.

SWAP OR SELL my Fuller micro speech or will accept offers over £35. Telephone Hornchurch 57487. I'll also add over 80 issues of PCW to above.

SWAP new Dragon 32 + Joystick and £100+ software for 48K Spectrum. Any offers considered. Will sell for £190.00. Tel: 794 6230 preferably evenings.

WANTED URGENTLY Vic 20 Super expander cartridge. Must be in perfect condition with instructions and packaging. Will pay up to £20. Andy Sheppard, 32 Gorse Street, Stretford, Manchester M32 0HZ.

WANTED SINCLAIR User mags number 1 to 14. Must be vgc. No barmy price please. Also ZX Computing pre June 83, Jim Wood, 28 Hough Road, Kings Heath, Birmingham 14.

SPECTRUM software, PSST, Lunar Jetman, ALC Alac, Lespring Knot in 3D, Jungle Fever, Jumping Jacks Spectral Panic. Sale £30.00 or swap. Upminster 26754.

BBC MICRO swap s/w. Prof N. London. Tel: 01 354 2674.

WOULD ANYONE be willing to donate any computer hardware to a computer club? Write to Towcester Computer Users Group, 20 Wordsworth Close, Towcester, Northants.

WANTED original 16/48K Spectrum software, particularly: Quil, Scope, Games Designer and any good Arcade/Adventure games. Also good copy of Zaxxon required. Tel: (0382) 4497 with details and prices.

NATIONAL ZX Spectrum user club bi-monthly newsletter. Many software offers subscription £2.75. Write to Guy Fullalove, Woodcoates, Camer Park, Meopham, Kent. CA13 0XS or phone Meopham 812719 after 5pm (A/F Guy).

SWAP SPECTRUM s/w ie, Sabine Wolf, Antics, Stop the Express. Phone John after 6pm, 01 476 8884.

SWAP T199/4A, cassette leads, books and software (total value £130) for 16/48K Spectrum or Sharp PC 1500 and cassette interface (other computers considered). Phone Clive, on Portsmouth 681163.

VIC 20 S/W Arcade *Furms* M/D Showstom Bewitched to swap for super expander or 8K rampack or joystick. Ring after 4pm. Ask for Tim. I would like to buy Flight 015 for £3.50 one or swap. Tel: Co. Durham 527752.

WANTED BBC B or CBM 64 + tape deck to swap. I have Yaesu FRG 7700 comms receiver + ATU, 30 MHz still boxed. Used once. Worth £370. Tel: Paul Peterborough 70223.

REALLY CHEAP technique to save valuable time when typing Spectrum programs. Send name and address to PSB, 10 Linden, Canvey Island, Essex SS58 9JA (SAE for test reply).

QL Yes — Sinclair QL!!

Used only to test — in box, as new.

Best offer secures.

Also: ZX SPECTRUM (48K)

Reserve machine, hardly used — also in box. Best offer over £70.

WANTED Good last daisywheel printer.

ALPHA-ROM (Spectrum 48K/Modified Version for 16K)

Eight-feature menu includes alphabetical and numerical sorting, indexing, review, update and copy (for printer). An invaluable aid for writers, teachers (register, marks, etc), small traders and hobbyists in all kinds.

HOME INVESTOR (Spectrum 16K/48K)

An essential program for the private investor. Enables user to ascertain future value; actual rate of growth; present values; period required to amass specific sum; mortgage and annuity calculations; flat and redemption yields; net all tax returns . . . and still more!

EACH £4.95 BOTH FOR £9.95 (POST FREE)

R.G. WATFIELD & Co (Econ) FR,

Author of Success in Investment

Dept. 1, 7 Bore Lane, Raynes, Essex CM7 9HL.

Telephone (0376) 27337.

ASTROLOGY

Wide range of Self-teaching and Accurate Calculation Programs for many computers including

Spectrum, BBC/Electron, CBM 64/VIC 20/PET Dragon, ZX81, Sharp, Texas TI99a NewBrain, Tandy, Genie, Oric

Please send large sae to:-

ASTROCALC

67 Peascroft Rd, Hemel Hempstead Herts HP3 8ER tel: 0442 51809

SOFTWARE BARGAINS!

SAVE OVER 60% on VIC 20 cartridges

VIC 20 Multi-packs, 4 cartridge games (assorted titles) VALUE £39.96 NOW ONLY £14.95!!

HALF PRICE COMMODORE 64 CARTRIDGES

Commodore 64 Multi-packs 3 cartridge games VALUE £29.97 NOW ONLY £14.95 Postage + Packing £1.00

COMPUTER BARGAINS!

COMMODORE VIC 20, Brand new boxed and guaranteed

NOW ONLY £69.95 Delivery Extra

Milton Keynes Music and Computers 17 Bridge St

Leyton Buzzard (0525) 376622

Bedfordshire

(Closed all day Thursday)



THE



RUN

IS HERE

FOR 48K SPECTRUM & COMMODORE 64

micro Adventurer

BRITAIN'S BEST-SELLING MAGAZINE FOR

ADVENTURE GAMES SIMULATIONS WAR-GAMING

IN YOUR NEWSAGENTS NOW — 75p
FOR QUOTES ON ADVERTISING RATES CALL
SIMON LANGSTON, 01-437 4343

Micro Adventurer
12/13 Little Newport Street
London WC2R 3LD



CARTOON GIANTS

Valhalla is now available for the Commodore 64. On the Spectrum the game wiped the floor with just about all the other Christmas releases and won Game of the Year at least a couple of award schemes. You might say that Legend are moderately confident about the program's chances on the 64.



For a general overview of the game which is not easily summarised, you'd best refer to the various reviews/Streetlife which PCW did around November last year, when the Spectrum version was first issued. Suffice to say it isn't quite like anything else and is probably best characterised as Legend themselves characterise it, as a computer movie in which you are the most important but not the only character.

There was much anticipation as to what the extra memory and graphics facilities on the 64 would mean to the overall look of the game. Graphically, what extra colours, better sprites, and no colour resolution problems has meant is a game that looks even more like a cartoon — the giants lumber along most convincingly and the Raven smoothly flaps its wing.

These changes add quite a lot to the game but perhaps nothing really crucial, what is crucial is a general 'speeding up' of the action — this is a version of *Valhalla* you can't leave for a second lest something gets stolen or you get killed. I suspect this is a delibe-

rate attempt by Legend to combat the 'bystander' syndrome in which people tended to simply sit and watch the action rather than take an active part. For example, objects that happen to be lying around like rings, wine, food, etc are far less likely to remain for long in this version — if you need to drink you better type in your instruction quickly because otherwise you can be sure one of the other characters will happily take it.

I think it is pretty safe to say that *Valhalla* on the Commodore is a better game not, primarily because of the graphics, but rather because of the change of pad. I have a quibble it is that the excellent sound of the 64 is not more widely used to provide some sort of continuous soundtrack — done correctly I think that might have moved the computer movie concept one step further still, but nevertheless *Valhalla* remains a unique and important game and Commodore 64 owners should beg, borrow or steal the money to get this one.

Program *Valhalla*
Price £14.95
Micro Commodore 64
Supplier Legend
PO Box 435
Station Road
London E4 7LX

RELIEVING LIFE'S BOREDOM

Block Buster is a quiz game for one or two players in which a series of general knowledge questions are asked by the computer.

Such games are usually dreadfully boring, but this one has some nice features — you can interrupt just as in real quiz games if you think you know what the whole question is and are sure of the answer.

One player controls one set of coloured blocks, the opponent the other — for each right answer you can build an extra block and eventually cross the screen.

The program comes with an extra tape of data for additional questions and retails for a surprisingly reasonable £5.95.

Program *Block Buster*
Price £5.95

Pick of the week

LOW-LEVEL FLYING

Tornado Low Level is the latest release from Vortex software, famous for *Android's 1* and *2* and it is marvellous, more than that, it has some of the most impressive 3D graphics I've ever seen on the spectrum. In fact, apart from the sound, it could easily be a Commodore 64 game.

The general idea is a little like Virgin's *Falcon Patrol* — you control a swing wing fighter which you pilot, refusing where necessary, to various targets depicted on a large scale map. This means zooming over a landscape at low level watching out for tall buildings and not getting lost.

The sense of speed is spectacular as is the shadow of the aircraft which behaves exactly as a shadow should, (you'll have to see the game to understand what I mean).

It's exciting and technically breathtaking — how much more can anyone get out of the Spectrum? Any chance of a version of *Zaxxon* using the same techniques, Vortex?

Program *Tornado Low Level*
Price £5.95
Micro Spectrum
Supplier Vortex
280 Brooklands Road
Manchester

Micro Spectrum
Supplier Compusound
32 Langley Close
Redditch
Worcestershire B98 0ET

BOOGIE ON DOWN

Quicksilver, despite the wheeling and dealing surrounding them, are still very much in business. Of its most recent batch of releases one of the most unusual is *Drum Kit* for the BBC.



snare, bass drum, and a couple of toms, one of which has the authentic da da da dwong, sound beloved of many a pop hit. The program is easy to use, with where the beat will fall, in relation to the other instruments, being illustrated on screen which scrolls as the rhythm is played.

You can change both the pitch and the relative volume of each instrument — constructed rhythms can be saved and loaded as will. It's excellently designed; now all you need is something to play along with it.

Program *Drum Kit*
Price £9.95
Micro BBC B
Supplier Quicksilver
Palmerston Park House
13 Palmerston Road
Southampton
Hampshire SO1 1LL

INSTRUCTION IN CODE

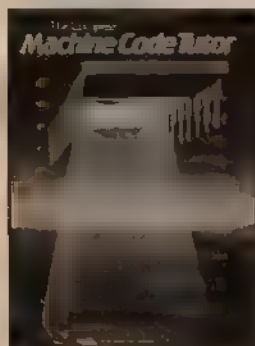
There have been various attempts at producing an effective teach yourself machine code program, but the subject has remained as elusive as ever. By far the best attempt comes from New Generation Software who has recently issued its *Complete Machine Code Tutor* for the BBC and the Spectrum.

The package consists of two

As the title suggests what you get is a program that enables you to use the sound chip on the BBC as a rhythm box and a pretty good one at that.

You control sounds labelled (reasonably convincingly)

cassettes and a short booklet although most of the text is actually on the program. There are essentially two elements to the cassettes — 33 lessons covering every instruction the Z80 can accept and a screen simulation which illustrates exactly what happens after every instruction and can be considered as a sophisticated one step assembler.



After each section there are a series of exercises — they start easy enough for even me to understand, so all five year olds should find it a doddle. One other good point — unlike all the books I have seen on teach yourself machine code — this does not jump straight in with hex arithmetic which, being far more difficult than everyone always pretends, puts a lot of people off.

Program The Complete Machine Code Tutor
Price £14.95
Micro Spectrum, BBC
Supplier New Generation Software
15 Sunnybank
Lyncombe Vale
Bath BA2 4NA

WAHS AND WOOSHES

Star Trooper is the latest release from Melbourne House and is, somewhat surprisingly, not for the Spectrum. It's a high speed ker-pow ker-pow which loads in three minutes using yet another high speed loader. To digress for a moment, with the possible exception of multi-part games using more than 64K (of which there

are very few), the vast range of turbo games is making the standard Commodore disc drive look pretty silly — only of use to a few business orientated users. Turbo games are loading more or less as fast as on disc for no extra cost on an ordinary tape price.

To get back to *Star Trooper*, the only thing really to be said is it's simple arcade stuff, dodging endless varieties of aliens but still good for all that. What I did like was the extensive music soundtrack that really does make the 64 sound like a synthesizer, being full of the kind of wahs and wooshes that made Vangelis the man is today.

Program Star Trooper
Price £0.95
Micro Commodore 64
Supplier Melbourne House
Church Yard
Tring
Hertfordshire
HP23 5LU

KEEP 'EM PEELED

Mirrorsoft has earned my continuing approval on the strength of the marvellous *Caesar the Cat* arcade game, but in fact the bulk of its release have been educational programs.

Look Sharp is available on the Commodore 64 — a machine not supplied over abundantly with educational material — and it basically concerns



itself with visual memory and observation. In *Old MacDonald's Farm* (the first part of the package) the child has to remember a farmyard scene and detect subtle differences between different animals.

The second program is called *S.O.R.T.* and is basically a hand eye co-ordination exercise — it's educational to about the same degree as *Pac Man*.

Program Look Sharp!
Price £7.95
Micro Commodore 64
Supplier Mirrorsoft
Holborn Circus
London EC1

INTERIM REPORT

Speaking as someone who never got over Bakunin's betrayal by the Trots at the first international congress; as someone who believes that a free state economy would produce cooperation rather than a male hierarchical outmoded concept of competition; and as someone who can only deplore the bastardised mish mash of competing class derived concepts that is the mixed economy in this country, that such an economy should be represented in a computer game can only be considered as further evidence of political apathy amounting to a virtual criminal negligence on the part of software houses in this so-called nation.

Having made these crucial political points, I should add that 1984 which represents the British economy and invites you to play Prime Minister, or collective wauling executive power if you prefer, is excellent — for two main reasons. Firstly it succeeds where other simulations often fail, ie, it is very visual, and secondly, it is complex, you really do have to think about the decisions you make.

Wages, Minimum Lending Rate, Government Investments, taxes, public expenditure, foreign aid and industrial grants are just some of the factors you have to take into account — but this being Britain none of your decisions will be implemented smoothly, numbers of special interests will fight for their corner in glorious conflict with one another. Something for ulcers could be a wise additional purchase if you buy this game.

Program 1984
Price £6.50
Micro BBC B
Supplier Incentive Software
54 London Street
Reading

NUMBERS INTO PICTURES

Figaro 64 is a sophisticated graphics orientated database for the Commodore machine.



It comes at a sophisticated price too — £75 + VAT which is £86.25 ie a lot.

On the other hand it's a pretty clever program not unlike *Easel* — the graphics package free with the Q1. Basically it will turn data — any collection of numbers — into a graph in any of six different graph formats including line, block and pie. It automatically caters for things like negatives, harmonic means, rounding, etc, and will produce graphs on any Epson or compatible printer.

More than all this it can manipulate your figures in a variety of ways to produce forecasts and various sorts of statistic and all this without being difficult to use. In short, wonderful, but expensive.

Program Figaro 64
Price £86.25
Micro Commodore 64
Supplier Saxon Computing
3 St. Catherine's
Drive
Leconfield
Beverley
Humberside

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, WC2R 3LD.

BBC*

- 1 (3) Fortress (Pace)
- 2 (-) Panga (Visions)
- 3 (-) Mr Wiz (Superiorsoft)
- 4 (1) Aviator (Acomsoft)
- 5 (-) 3D Space Ranger (Microbyte)
- 6 (-) Overdrive (Superiorsoft)
- 7 (2) Blagger (Alligata)
- 8 (-) JCB Digger (Acomsoft)
- 9 (-) Trench (Virgin)
- 10 (7) Eagles Wing (Invasion)

*All model B
(Figures compiled by Micro Management
0473 59181)

Atari

- 1 (1) Incredible Hulk (Adventure International)
- 2 (5) Jetboost Jack (English)
- 3 (-) Cavens of Kalka (Cosmi)
- 7 (-) Zaxxon (Datasoft)
- 5 (-) Saga 5 The count (Adventure International)
- 8 (-) Circus (Channel 3)
- 7 (4) Slurpy (Cosmi)
- 6 (10) Flak (Funsoft)
- 9 (-) O' Riley's Mine (Datasoft)
- 10 (5) Rally Speedway (Adventure International)

*Cartridge \$48K Doc
(Figures compiled by Calisto Computers 021
632 6456)

Vic 20

- 1 (-) Flight 015 (Ferranti Devonport)
- 2 (-) Crazy Kong (Interceptor Micro)
- 3 (5) Computer War (Thorn Em)
- 4 (1) Tower of Evil (Thorn Em)
- 5 (8) Phantom Attack (Master Tronics)
- 6 (9) Sub Hunt (Master Tronics)
- 7 (7) Vegas Jackpot (Master Tronics)
- 8 (8) Chanot Race (Micro Arica)
- 9 (-) Scrambler (Master Tronics)
- 10 (-) Lundermine (Master Tronics)

(Figures compiled by Boots/Websters)

Books

- 1 (1) Commodore 64 Programmers' Reference Guide, Commodore
- 2 (3) Guide to playing the Hobbit, Eilan
- 3 (2) 60 Programs for Commodore 64, Erlaine et al
- 4 (4) Step by Step Programming, Spectrum Book 2, Graham
- 5 (7) Sinclair QL Companion, Allen
- 6 (7) Step by Step Programming Spectrum Book II, Graham
- 7 (5) Easy Programs for Commodore 64, Stewart and Jones
- 8 (-) Very basic basic — CBM 64, Eiler Shaw and Schofield
- 9 (5) Creepy Computer Games, Erlaine et al
- (-) Very basic basic Spectrum, Erlaine and Schofield
- (-) Teach Yourself Computer Programming on Commodore III, Carter and Huzan
- (-) Business Applications for Commodore 64, Hall

Commodore 64

- 1 (4) Beach Head (Centrosort)
- 2 (-) Cavelon (Ocean)
- 3 (9) Revelation (Softtek)
- 4 (-) Pinball Wizard (CP Software)
- 5 (10) Solo Flight (Centrosort)
- 6 (-) Savage Pond (Starcade)
- 7 (-) Heroes of Karn (Interceptor)
- 8 (8) Space Pilot (Anrog)
- 9 (-) Flight Path 737 (Anrog)
- 10 (-) Aqueduct (Interceptor)

(Figures compiled by Boots/Websters)

Dragon 32

- 1 (1) Buzzard Bell (Microdeal)
- 2 (2) Outburst in Space (Microdeal)
- 3 (8) Mr Dig (Microdeal)
- 4 (8) Dungeon Raid (Microdeal)
- 5 (4) Hungry Horace (Melbourne House)
- 6 (-) Kingspied (Beyond)
- 7 (3) Dragon Chess (Gadco)
- 8 (5) Bug Driver (Master Tronics)
- 9 (-) The King (Microdeal)
- 10 (8) Sramble (Microdeal)

(Figures compiled by Boots/Websters)

ZX81

- 1 (2) Planet Raider (Novus)
- 2 (2) Rhydon Ordal (Novus)
- 3 (-) Scramble (Quicksilver)
- (1) Alien Rain (CRL)
- (5) Flight Simulation (Pison)
- 6 (-) Space Raiders (Pison)
- 7 (4) Wait the Plank (Novus)
- 8 (-) Chess 1K (Pison)
- 9 (7) Mothership (Pison)
- 10 (9) Sabotage (Pison)

All 10K except where indicated.
(Figures compiled by Boots/Websters)

Spectrum*

- 1 (1) Jet Set Willy (Software Projects)
- 2 (-) Sabre Wulf (Ultimate)
- 3 (9) Fighter Pilot (Digital Integration)
- 4 (-) Blade Alley (PSS)
- 5 (3) Payton (Beyond)
- 6 (4) Chequered Flag (Pison)
- 7 (8) Blue Thunder (Foundry Systems)
- 8 (5) Jack and the Beanstalk (Thor)
- 9 (6) Zaxxon (Starzone)
- 10 (-) Scuba Dive (Dumell)

*All 48K
(Figures compiled by WH Smith and Son, London)

NOT SNAPPY

Data Handling on the Commodore 64 Made Easy is not what you might call a snappy title but it's a useful book very much in the 'the Commodore 64 really is suitable for use as a business machine honest gov' style which is popular at the moment.

It concerns itself with all things to do with the sorting, handling, storage and manipulation of data. This involves topics like use of disc drives, sorting routines, string searching and the like and it's yet another area which is poorly handled in the manual — consequently this is a genuinely useful book.

The book is illustrated throughout with a series of diagrams and programs providing a number of useful basic subroutines.

Book *Data Handling on the Commodore 64 Made Easy*
Price £5.95
Micro Supplier Commodore 64 Granada Publishing
8 Grafton Street
London W1X 3LA

COLUMNS

The Adventurer's Notebook is not a book of listings and for the most part contains very little text. What it is, quite simply, is pages and pages of boxes and columns labelled verbs and nouns — the function being to enable people trying to solve adventures to keep sophisticated records of what actions/directions they have tried at each location.

It's a simple idea but I can think of plenty of adventurers who might have use for it as they are trying their fourteenth synonym for unlock and the door is still not budging. It's not all charts — the opening of the book as a fairly good introduction to the subject of adventure and picks out a few of the best.

Book *The Adventurer's Notebook*
Price £3.95
Micro Supplier General Duckworth
The Old Piano Factory
43 Gloucester Crescent

This Week

Program	Type	Micro	Price	Supplier	Factory	Arc	Spectrum	£5.95	Poppysoft
Electro Freddy	Arc	Amstrad	£4.95	Amsoft	Clud	UI	Spectrum	£4.95	Roylich
Allen Break In	Arc	Amstrad	£7.95	Amsoft	Model 80	UI	Spectrum	£6.95	Seven Stars
Spannerman	Arc	Amstrad	£7.95	Amsoft	Fun to Learn	Ed	Spectrum	£6.95	Shards
Storyline	Ed	BBC B	7.95	Daco	Ugh!	Arc	Spectrum	£5.95	Softtek
Mystery in the Java Sea	Ad	BBC B	£7.95	Shards	Twilight Zone	Arc	Spectrum	£5.95	Thor
Frac Maths	Ed	BBC B	£6.95	Shards	Megafruit	S	Spectrum	£5.95	Thor
Science 1	Ed	BBC B	£6.95	Shards	Grenline	Arc	Spectrum	£5.95	Thor
Wonder Worm	Arc	BBC B	£5.95	Thor	Night Stalker	Arc	Spectrum	£5.95	Thor
Blocker	Arc	BBC B	£5.95	Thor	Spider	Arc	Spectrum	£5.95	Thor
Pyramid Painter	Arc	BBC B	£5.95	Thor	Mega Fruit	Arc	Spectrum	£5.95	Thor
Desperate Dan	Arc	BBC B	£5.95	Thor	Clerky	Arc	Spectrum	£5.95	Unique
Alice In Videoland	Arc	Commodore 64	£12.95	Audiogenic	3D Silicon Fish	Arc	Vic 20	£5.95	Thor
Go Sprite	UI	Commodore 64	£9.95	Mirrorsoft	Luv Bug	Arc	Vic 20	£5.95	Thor
Monster Maths	Ed	Commodore 64	£6.95	Shards					
Poker	S	Commodore 64	£5.95	Tom Pinon					
Graphic 1 V	UI	Commodore 64	£9.99	Zippart					
Superbowl	Arc	Dragon	£6.95	Cable					
Operation Safari	Ad	Dragon	£7.95	Shards					
Stickman Olympics	Arc	Spectrum	£5.50	Avalon					
New Venture	S	Spectrum	£5.95	Faloon					
Kosmic Kanga	Arc	Spectrum	£5.95	Micromania					
Contract	Ad	Spectrum	£3.95	Newventure					
Virus	Arc	Spectrum	£5.95	Orange					

Key: Ad — adventure/Arc — arcade/Ed — education/
S — strategy-simulation/UI — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



The tail waggles

In the last couple of weeks there have been a number of articles in the computer press saying things like "The Sinclair QL — has it missed the boat?"

These articles will probably have been written by the same journalists who a few months ago went gaga over a couple of demo machines seen from a couple of hundred feet away and a rosey provisional manual. The new articles tell you, in a hushed dramatic voice, how the journalists has discovered problems in the machine which will lead to the downfall not only of Sinclair Research but probably the entire free world.

This situation reminds me of the plot of a film called *No Highway* — it starred James Stewart as a plane expert who keeps confidentially predicting that the tail designs of one type of airliner is unsound. This being a plane in service all over the world, he is attacked by all the airlines and almost locked up — and the tail still doesn't fall off. In the movie at the last minute just before he is carted away, ruined and humiliated, there is a giant crunch and the tail on the test plane he has been wagging by machine hour after hour finally cracks and splits asunder. End of film, scientist vindicated and not a dry eye in the house.

So as I say there are a lot of journalists playing James Stewart. The question is, is

the QL's tail going to fall off or not? The reason for writing this piece is that, in my opinion, whilst there is no question the tail has been wagging — just look at the production delays — I think there is still time for Sinclair to do something about it.

The worrying thing is that Sinclair is trying to pretend that there's nothing wrong and talks confidently of having finalised the design of the Rom when, to even the most friendly observer, the tail is still showing signs of movement.

Let me pick out one thing as a classic example of a waggle. *Quill*. Here I am, a journalist of sorts who spends much of his time writing articles — I ought to be just the sort of professional, rather than business, user the machine is intended for. More than that, I am disposed to like technology. I don't really have to be convinced that using a word processor is a good idea.

I used *Quill* on a recent if not final version of the QL. It has one big drawback. If you type at anything other than a snail's pace (and I am no expert) you will find that you outpace the rate to which the QL can print what you type to the screen. When writing this is irritating but reasonably harmless. What about when you delete a few words? What happens is that your keypress deletes outpace the screen deletes making you think you have deleted less than is, in fact, the case — consequently you press delete too many times and find large amounts of perfectly acceptable prose disappearing. Whatever Sinclair say, you can't have 'differing viewpoints' about this — it just won't do.

I want to like the QL, its basic price/specification is immutable and unchangeable: 128K, plus two microdrives (which are at least better than ordinary tape, whatever else), plus goodish resolution graphics with an OK keyboard for £399 represents outstanding value.

I want it to succeed. I can even live with the silly plastic feet that don't fit properly.

But Sinclair has to stop the tail wagging and start producing the QL in volume. And it would be nice to see some more software for it too.

Graham Taylor

In the swim

Puzzle No 113

A sponsored swim by members of the lower third produced results that were, quite frankly, disappointing. To make the totals seem larger than they were the results were announced as follows:

Alison and Ben raised £3.41 between them while Ben and Chris raised £2.87 together. Chris and Derek's total was £2.23 and Derek and Elizabeth managed to raise a combined total of £4.68.



Now, I also happen to know that the total sum raised by Alison, Chris and Elizabeth came to £5.18.

Can you say how much each child earned individually?

Solution to Puzzle No 108

We need to find an exact multiple of 11, in which no digit is duplicated and which is "just over a million". Therefore the smallest such number found will be the logical answer. In the program we test each successive multiple (smallest being 9304153 * 11) to see if there are digits in the answer which occur more than once. (Note that, for convenience, we convert the sum to cents — rather than dollars and cents.)

```
10 LET N = 9304153
20 LET T = N * 11
30 LET TS = STR$(T)
40 FOR W = 1 TO 8
50 FOR X = W + 1 TO 9
60 IF MID$(TS,W,1) = MID$(TS,X,1) THEN GOTO 110
70 NEXT X
80 NEXT W
90 PRINT "AMOUNT ON CHEQUE = "; LEFT$(TS,7); ", "; RIGHT$(TS,2)
100 END
110 N = N + 1
120 GOTO 20
```

Thus the prize amounted to \$1023475.86.

Winner of Puzzle No 108

The winner is: G L Godman, Woodfield, Shuthonger, Tewkesbury, Glos., who receives £10.

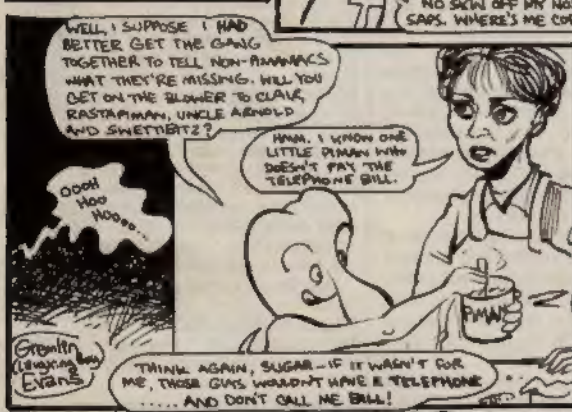
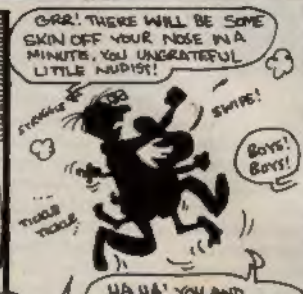
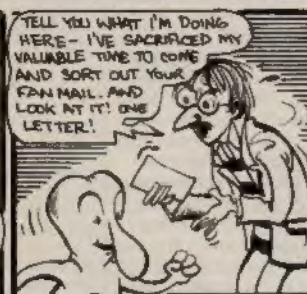
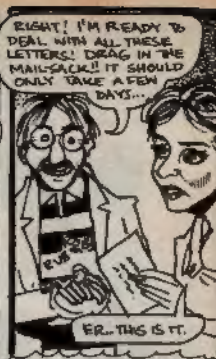
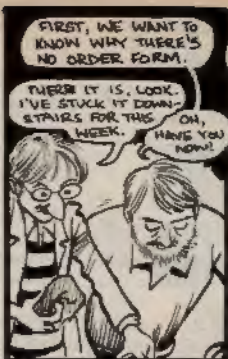
Rules

If the puzzle can be sensibly solved using a computer then the winner will have included a listing of the program used to find the correct answer. The closing date for entries to Puzzle No 113 is July 13.

The Hackers



PANDEMONIUM AT THE OFFICES OF AUTOMATA U.K. LTD.



AUTOMATA

- ... but seriously, **PIMANIA** - the cult adventure that's for real! No one has won the Golden Sundial yet. Spectrum 48K £10 ☐
- DARTZ** - the animated arrowing experience. Free choval fun on the flipside. Spectrum 48K £5 ☐
- PI-EYED** - the comedy cartoon arcade game, starring the PIMan. Free protest disco record. Spectrum 48K £5 ☐
- PI-BALLED** - A triumph of the arcade programmer's art. Steering the PIMan. Free offensive Reggae music. Spectrum 48K £5 ☐
- MORRIS MEETS THE BIKERS** - exciting arcade fun, as seen on TV. Outragous free 400-wap record. Any Spectrum £5 ☐
- YAKZEE** - Bruddy wonderfurs game of rock and skirr. An oriental masterpiece for Dragon 32 plus Spectrum 48K £5 ☐
- GO TO JAIL** - Play the game find out what all the fuss is about, cookie. Spectrum 48K £5 ☐
- OLYMPIANIA** - He's back! He's going for gold! He's sober! Free National Anthem on the flipside. Spectrum 48K £5 ☐
- THE PIMAN'S GREATEST HITS** - amazing stereo L.P. cassette £3 ☐
- "I'M A PIMANIAC"** - T-Shirts (state size) £5 ☐
- JOIN THE PIMANIACS CLUB** for 20% off all products, pi-monthly magazine etc. Annual Subscription £5 ☐ U.K. £7 ☐ overseas

I ENCLOSE THE RIGHT MONEY, OR DEBIT MY ACCESS/VISA CARD

CARD NUMBER

MY SIGNATURE

MY NAME

MY ADDRESS

POST CODE

NO EXTRASI ALL OUR PRICES INCLUDE DELIVERY AND V.A.T.
Send to: AUTOMATA U.K. LTD. 27 Highland Road, Portsmouth, Hants. PO4 8DA
24-HOUR CREDIT CARD HOTLINE (0705) 735242

